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2½%
nd—Glass Makers'
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Silicon—15-50-75-
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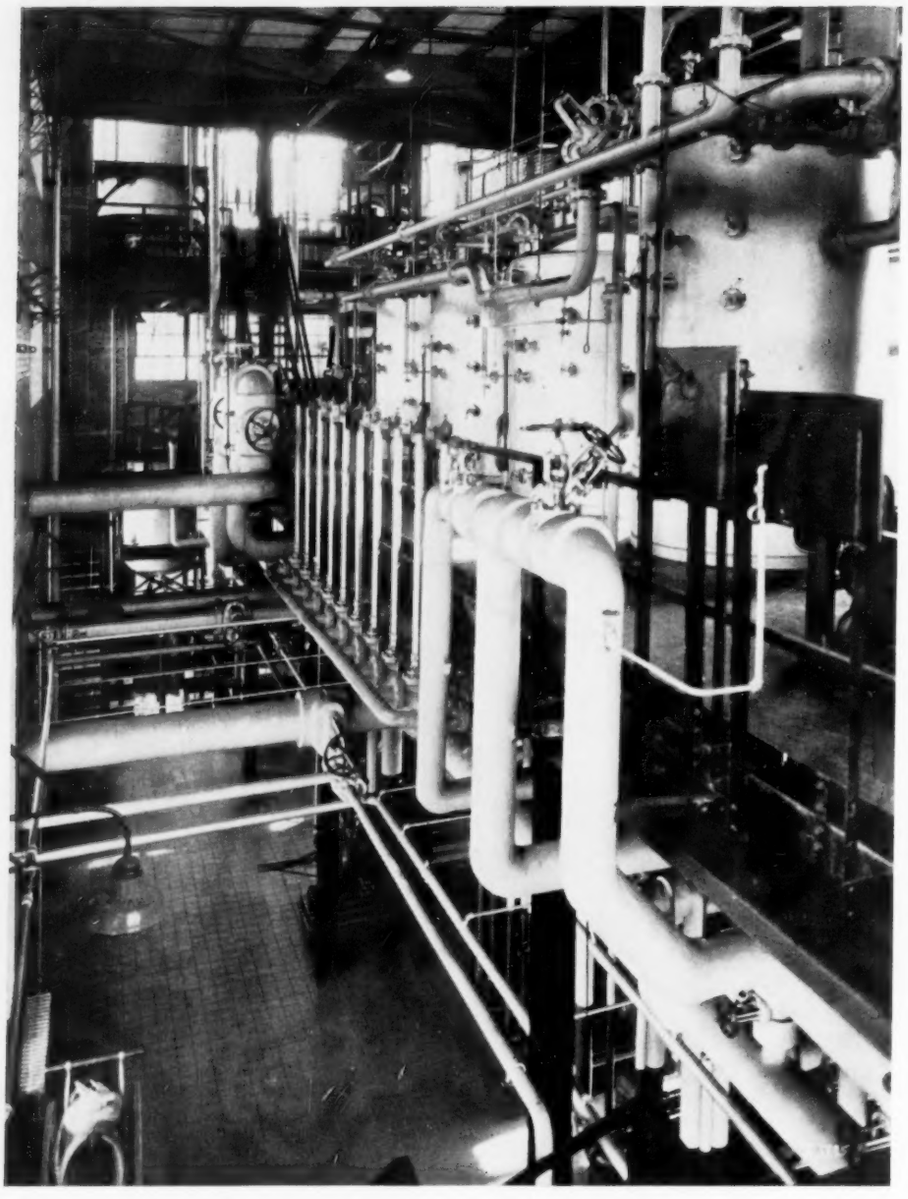

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Volume 91 Number 24

STEEL

For forty-eight Years—IRON TRADE REVIEW

PRODUCTION • PROCESSING • DISTRIBUTION • USE

The Week in Perspective

CONSIDERING its handicaps, the wonder is not that activity in the iron and steel industry is ebbing but rather that it holds up as well as it does. Approaching rapidly are the year-end holidays, the close of the fiscal year for a majority of corporations, consequent reductions in inventories for accounting and tax purposes, and such externals as the convening of a congress which finds it easy to deadlock with the President, the necessity for additional federal taxation—the incidence of which doubtless will be heaviest upon industry, the increasing likelihood of a special session of congress shortly after inauguration, and war debts. Surmounting all this is the cumulative discouragement of three years of depression.

Encouragement in Shapes, Rails, Auto Needs

Yet the market situation is not without its hopeful side despite a further easing of steel production (p. 49) to 15 per cent, or three points below the average for November (p. 12). Largely because a Pittsburgh district fabricator booked over 20,000 tons for three federal projects, structural awards last week (p. 46) were the second highest of 1932. First indications of rail buying have appeared in the West, the Santa Fe proposing (p. 45) to take 26,484 tons next year. Bids have been called (p. 55) Feb. 2 on the 200,000 tons of steel in the San Francisco-Oakland bridge. And Ford has made the first commitment (p. 41) for material for his 1933 line . . . . Price movements are narrow, STEEL's index on steelworks scrap continuing to decline (p.41) but other indexes holding. Most iron and steel quotations have now been extended into the first quarter.

Mixed Situation Dampens European Markets

Abroad, the nearby holidays and the uncertainty of international events also are deterrents (p. 55). Fluctuations in sterling have quieted trade on the Continent, and world demand for iron and steel generally is diminished . . . . Even so, imports of German nails (p. 49) are vexing the warehouse market at Boston, while further receipts of foreign barbed wire for mail order houses are reported (p. 48) at that port . . . . Congress, revealing it still has a complex on forced labor, has before it a bill (p. 11) obviously designed to prohibit the entry of soviet products . . . . Submitting its annual report, the federal tariff commission cites (p. 11) progress in its investigation of the cast iron pipe and cotton tie situations. A hearing on ties will be held Jan. 12.

Special Session To Be a Worry of Spring

So irreconcilable are the views of congress and the President, a special session shortly after President-elect Roosevelt is inaugurated

A record for bolted construction is claimed for this 27,500-barrel tank, 90 feet 2½ inches in diameter, 24 feet 1½ inches high, of Roosevelt Oil Co., Mt. Pleasant, Mich. It took nearly 60,000 bolts. Columbian Steel Tank Co., Kansas City, Mo., reports no sign of strain or seepage

appears certain (p. 11). Democratic leaders in congress, unwilling to handicap their incoming executive with Republican policies, may find it convenient to come up to March 4 and the end of this session with no action on such controversial matters as the sales tax, which President Hoover has revived, appropriations for the year beginning next July 1, and governmental economy.

They Are Pursuing Business to Its Lair

Confident that a vigorous policy will conjure up some business, automobile manufacturers continue to gird for their 1933 campaigns. At the forthcoming shows a number of cars priced lower than any heretofore will be exhibited, with mail order houses possible entries in the field (p. 14). Detroit hears that Chevrolet is equipping 1933 models with an octane selector, to permit economical use of low price gasoline, and features a new type of engine mounting; that Ford is buying some steel for his new models; that tubular front axles are increasingly popular . . . . Also in a fighting mood is the Republic Steel Corp. (p. 12), arranging to fabricate all-steel farm buildings and explore a comparatively unknown market.

Economy May Be Experience, Design or Fuel

Economy in the manufacture of steel castings is dependent upon a knowledge of the characteristics and behavior of the steel in the mold and practical application of this information to design, requiring (p. 21) close co-operation between the designing engineer and the foundryman . . . . In the production of open-hearth steel, economy is largely a matter of correct roof design (p. 29), as the life of the roof controls the length of a campaign . . . . Economy in fuel consumption and reduction in the time of heats has been effected (p. 36) in the production of open-hearth alloy steel by atomizing fuel oil with natural gas at 150 pounds pressure instead of steam.

To Make Engineers Class-Conscious

Formation of the Engineers' Council for Professional Development, to enhance "the prestige and solidarity of the engineering profession," is announced at New York by retiring president of American Society of Mechanical Engineers (p. 26). Progress reports of the various divisions of the society reveal (pp. 26, 57, 58) that steady gains are being made in technical and economic phases of industry despite the depression . . . . At the National Exposition of Power and Mechanical Engineering (p. 26) over 300 exhibitors submitted graphic evidence of mechanical improvement . . . . What industry needs, the American Management association is told (p. 12), is a good old-fashioned evangelistic revival.

The VOICE of INDUSTRY

Communications appearing here do not necessarily reflect the opinion of STEEL *or of its editors.*

Is Steel House Answer to Slum Problem?

To the Editor:

Is it not possible that the one answer to the low-cost individual house is close at hand in the development of steel houses of standardized sections, assembled and finished to meet individual requirements?

What would such houses offer? As to cost, we have only to turn to the automobile industry to see the comparison between the costs of single-unit and quantity production. The prejudice to the finished appearance arising to hinder steel house development seems to be unfounded. We know that the first closed bodies of automobiles were made mostly of wood. It was only with the use of steel that the closed body became the accepted standard of the buying public. Is it possible in automobiles, between wood and steel, to compare the cost, appearance or real value in many other ways?

Perhaps the time is not far distant when there will be an industrial community which will be centered in its wholesale houses, large retail shops, office buildings, civic centers, amusement enterprises, etc., which nucleus will be fringed by factories and mills and other kinds of productive business enterprises. Beyond these will be clusters of homes, or living communities of those who depend on the central community for their livelihood, amusements, and the necessities of their daily lives. These living communities would group themselves about a school, a drug and a grocery store, a doctor and a dentist, and the desired number of churches. They would be located from three to 15 miles, from the main center. It would be possible for each family group included in these living communities to have its own individual means of transportation. It could be possible, also, for each group to have a home of its own, on property of its own.

The house would not be expensive, but its fittings and fixtures could be as up-to-date as the most costly, if not so elaborate. It would be fireproof, vermin-proof, sufficiently warm, comfortable and livable to suit the most exacting. The speed and facility with which such houses could be built make this all the less fanciful.

In such an industrial center with its numerous outlying living communities there would be no reason or excuse for slums such as now exist in great cities.

What greater stake can be gained by the steel industry than by helping to promote the development of low-cost, individual houses of steel and thus creating a large and hitherto undeveloped market for the use of its products?

J. M. KIEFER, President,
Kiefer Sheeting & Painting Co.

Pittsburgh, Pa.

To the Editor:

During the past few months I have heard some comment to the effect that the American public will not accept "machine-made" dwellings of steel construction. It is said that the public scorns box-like construction, flat roofs, and extreme modernistic design.

It will be a pity if steel houses are to be prejudiced adversely before they are given a full opportunity to demonstrate their merit. When steel is used intelligently, it lends itself to good architectural effect as readily as any other material.

The steel industry should guard against a wave of public disapproval of steel by insisting that houses of steel be designed along pleasing architectural lines.

ARCHITECT

New York

Congress Delay on Business Points to Special Session

WASHINGTON — The second and final session of the 72d congress has been sitting only a week, but already it is apparent that the chief concern of business will be the negative rather than the positive accomplishments of this session.

Beyond all doubt, a special session will be forced upon incoming President Roosevelt shortly after his inauguration March 4—forced partly by the deadlock between congress and President Hoover and also by a desire of Democratic leaders to avoid legislative commitments at present.

The result is that federal economy and new taxes, probably the two most important matters affecting business, will not be disposed of finally for four or five months.

Normally, the chief business of the short session, which ends constitutionally on March 4, is to pass appropriation bills for the fiscal year beginning the following July 1. This year economy in federal expenditures is interlinked with appropriations.

Reduction in salaries—the President having recommended an addition of 11 per cent to the present 8 1/3 per cent cut—and also in personnel will become effective next July 1, partly upon new Democratic appointees, hence loathness of the present congress to deal with Roosevelt appointees in advance.

Sales Tax Gaining Favor

Again President Hoover has recommended a manufacturers' sales tax, only food and low price clothing to be exempt, a proposal quite similar to that introduced in the house last March and shortly thereafter beaten decisively in the house.

The complexion of congress is unchanged from last spring, but undeniably there is a growing sentiment for a sales tax. When the measure was last discussed, its application to the iron and steel industry would have been upon the final fabrication. For example, there would be no levy on a sale of plates by a mill to a tank fabricator, but on the value of the assembled tank the purchaser would pay 2¼ per cent or whatever rate was fixed.

After the election of Governor Roosevelt it was said by those close to him that a special session in the spring could be avoided if congress balanced the budget, took steps to end prohibition, enacted legislation to aid agriculture and revised the Reconstruction Finance Corp. This program is so obviously controversial that there is no hope for its consummation prior to March 4.

Concerning the tariff, surprisingly little is being said. An influential Democrat—Representative Collier of Mississippi—has introduced a bill instructing the President to prohibit the entry of goods from countries where labor is not free. It is self-evident that this is a thrust at Russia.

A reorganization of the Reconstruction Finance Corp. seems certain, especially a liberalization of its policy to assure greater and speedier appropriations.

Attorney General Mitchell has recommended to congress that the anti-trust laws be modified to permit greater co-operation in industry. His stand is that this is desirable, but the department of justice has no authority to interpret the laws more leniently.

Hold Hearing on Fluorspar

A hearing was held by the tariff commission Dec. 8 in connection with decreasing the duty on fluorspar at the request of French interests. The present duty on low grade is $8.40 a ton. F. F. Colcord represented United States Smelting, Refining & Mining Co., Karl D. Loos and Fred R. Ribbs, Illinois-Kentucky interests.

Report Cites Progress

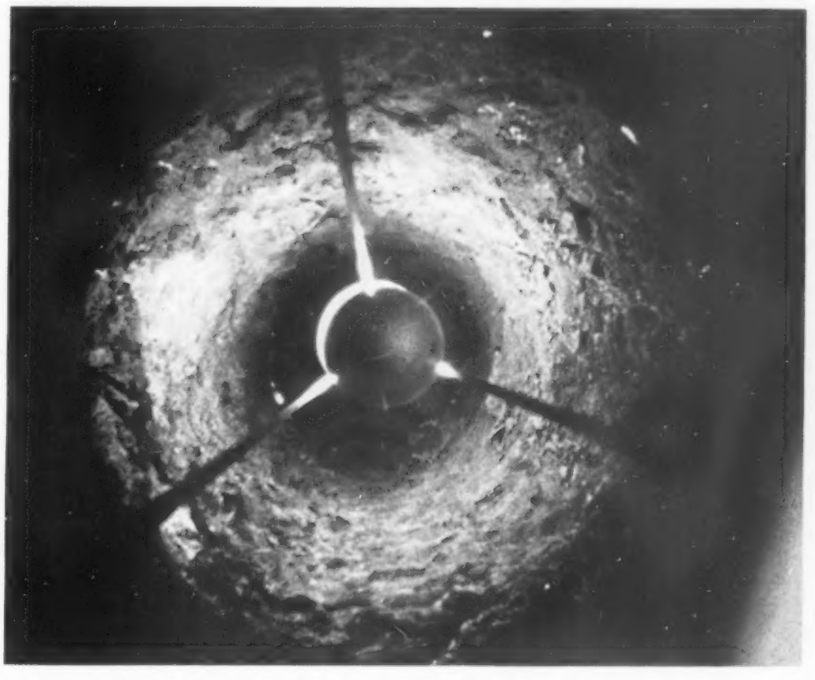
The United States tariff commission in its annual report claims progress in its investigation of the cast iron pipe and cotton tie market situation, with reference to the possible increase in the tariff.

Field work on cotton ties in domestic markets has been completed, an analysis of imports made and plans with respect to the foreign investigation are being made. A hearing has been set for Jan. 12.

Commenting on the cast iron pipe and fittings investigation the commission states that "the United States occupies a predominant position in the world's cast iron pipe industry, producing normally more than all other countries combined. In value, however, domestic production decreased from $74,615,420 in 1929 to $45,406,096 in 1931. By weight the output declined 44 per cent between 1926 and 1931.

"About 80 per cent of the total imports of cast iron pipe comes from France and the remainder from Belgium, England and Germany. The maximum of imports was reached in 1926 at 94,000 tons valued at $2,500,000. Since then, a steady decline has been noted, and in 1931 only 8018 short tons valued at $167,159 entered, and a negligible amount in the first five months of 1932."

The commission states that a date



EXPLORING THE PRIVATE LIFE OF TUBING: By means of an illuminated extension telescope known as the Tube Wall Telescope, developed by Carl Zeiss, of Germany, the condition of inside walls of pipe or tubing or any container in which it is impossible or undesirable for workmen to enter, may be readily ascertained. The three radial lines in the above illustration, which is by courtesy of National Petroleum News, Cleveland, are head supports of the telescope

for a public hearing has not yet been set and that the plans for investigational work on this subject in Europe are underway.

Business News of Washington

Twenty-eight trade practice conference rules of fabricators of ornamental iron, bronze and wire have been made public by the federal trade commission.

□ □ □

A conference on taxes will feature the American Mining congress' annual meeting in Washington, Dec. 15-16. R. C. Allen, president, Lake Superior Iron Ore association, Cleveland will be chairman of the conference.

□ □ □

Senator Reed, of Pennsylvania, has protested to President Hoover over the decision of the customs bureau that the coal tariff is in violation of the most favored nation clauses in commercial treaties with Germany and Great Britain.

□ □ □

An examiner of the interstate commerce commission has found that the rate charged on old steel rails, in carloads, from Valdosta, Ga., to Jacksonville, Fla. is not unreasonable or otherwise unlawful and the complaint has been dismissed.

□ □ □

A report to the department of commerce from Commercial Attache Butts at Tokyo states that steel and machinery industries in Japan are operating at capacity and have advance orders ranging from three to six months. The volume of railroad freight traffic is increasing and the shipping business has improved since the depreciation in the yen exchange.

□ □ □

Certain poultry wire netting or fencing, part being galvanized before weaving and part after weaving, was assessed when imported at 50 per cent and 60 per cent respectively under the provisions of a presidential proclamation.

The importer protested that it was properly dutiable at 45 per cent under the provisions of the tariff act of 1930. The United States customs court sustained the importer's protest but the court of customs and patent appeals has reversed the lower court.

This decision was in the case of the United States against Sears, Roebuck & Co.

Is Booked Through December

Birmingham Ornamental Iron Works Co., Birmingham, Ala., has orders on hand to warrant operation for the rest of the year. This company employs 28 men.

Republic Hooks Up On Farm Buildings

REPUBLIC STEEL CORP., Youngstown, O., has completed arrangements with the James Mfg. Co., Fort Atkinson, Wis., and Elmira, N. Y., to fabricate a new line of all-steel farm buildings, according to T. M. Girdler, chairman and president of Republic.

The new line is claimed to remove the fire and wind hazard of ordinary farm structures, reduce insurance rates, set new standards of sanitation and protection for animals and for storing crops. The marketing will be handled by the field organization of the James company.

This arrangement will utilize Republic's facilities for producing bars, galvanized sheets, tubing, wire and bolts and nuts. Fabrication facilities of the Berger Manufacturing Division at Canton, O., will be used.

Trade Needs Old Fashioned Revival

OPINIONS and round-table views on various angles of sales management were exchanged at the industrial marketing conference of the American Management association held at Pittsburgh, Dec. 5-6.

Papers were presented which included the consideration of the many sides to industrial sales management under present conditions, sales pricing policies, sales financing and the growth of the free-service item in industrial selling.

"What selling needs today is a good old evangelistic revival," said F. B. Heitkamp, general sales manager of the Cincinnati Milling Machine Co. and Cincinnati Grinders Inc. "The spirit which causes men to do better than they believe possible needs to be brought back.

"The days ahead are days of harder work, and sales executives will be charged with the responsibility of suggesting and executing policies which will release pent-up capacities and which will arouse enthusiasm."

This conference of the Management association was under the direction of C. J. Stillwell, vice president, Warner & Swasey Co., Cleveland, and also included papers presented by H. S. Beal, manager of the Jones & Lamson Machine Co. and president of the National Machine Tool Builders' association; Dr. Ralph A. Young, Wharton School of Finance and Commerce, University of Pennsylvania; L. B. Williams, deputy chairman, Federal Reserve Bank of Cleveland; H. P. Bailey, Rotor Air Tool Co., Cleveland; and Malcolm Muir, president, McGraw-Hill Publishing Co., New York.

Contract Let for Large Stress Relieving Furnace

For stress relieving large sections of welded steel pipe to be used in connection with the Hoover dam construction work, Boulder, Colo., an unusually large heating furnace will be built by the Rust Furnace Co., Pittsburgh, contract having been awarded recently by the Babcock & Wilcox Co., Barberton, O., the latter company handling the welding work.

The pipe sections to be stress relieved are 30 feet in diameter and 24 feet long, made up of plates 2⅞ inches thick. Each section weighs about 150 tons and will be charged on a special car for introduction into the furnace. Heating cycle will be 6 hours, with a close temperature differential being maintained throughout the furnace at all times during the cycle.

The furnace is to be oil fired. Approximate inside dimensions are: Length, 41 feet; width, 36 feet; and height, 30 feet.

Mills Active Members of Steel Construction Group

The American Institute of Steel Construction Inc., New York, now has all members on an active basis, whereas previously three of the larger fabricators—American Bridge Co., Pittsburgh; McClintic-Marshall Corp., Bethlehem, Pa., and Jones & Laughlin Steel Corp., Pittsburgh—were on what was called a contributing basis.

In addition, the institute has four new members: Virginia Bridge & Iron Works, Roanoke, Va.; Bethlehem Fabricators Inc., Bethlehem, Pa.; Burger Iron Co., Akron, O., and R. C. Mahon Co., Detroit.

The institute membership, comprising the great bulk of fabricating capacity of the country, is now the largest in the history of the organization. The institute will expand its marketing promotional work to a basis more comparable with that of a few months ago.

End Alloy Sales Agency

Associated Alloy Steel Co. Inc., Cleveland, will close its offices Jan. 1 and thereafter the three constituent companies will market their products through their own sales organizations. These companies are

the Ludlum Steel Co., Watervliet, N. Y.; Sharon Steel Hoop Co., Sharon, Pa. and Timken Steel & Tube Co., Canton, O. The Associated company was organized in February, 1930, to co-ordinate the sales of corrosion, heat and wear-resisting alloys of the three companies.

Roads Oppose Ohio Canal as Youngstown Urges Project

The Pennsylvania, Baltimore & Ohio, Pittsburgh & Lake Erie and other railroads made public last week a brief filed with the board of army engineers on the Lake Erie-Ohio river canal project. Briefly, the railroads asserted that benefits and tonnages which would be diverted over this canal have been greatly exaggerated and that the canal "would accrue very largely to a few coal and steel producers."

The army board of engineers has taken no action, although its engineers recently reported adversely on the canal project.

At the same time the railroads' brief was filed, a proposal was made by the Youngstown, O., chamber of commerce for a canal from Rochester, Pa., on the Ohio river, via the Beaver and Mahoning rivers, to Struthers, O. Estimates place cost of such a canal at $30,500,000. This compares with the army engineers' estimate of $111,700,000 for a canal through to Lake Erie at Ashtabula, O.

Bethlehem Unifying Sales

E. G. Grace, president, Bethlehem Steel Co., has announced that as a further step toward a unified sales organization the department of railway cars and machinery will become absorbed by the general sales department, with G. W. Struble of the merged division reporting to Paul Mackall, vice president.

Mr. Struble, as assistant to vice president, will continue acting in the sale of the products with which he has been identified and will also assume further duties.

Employment Up in October

Washington — October employment in the iron and steel industry increased over September, according to the bureau of labor statistics.

Reports were received from 209 iron and steel mills which gave their October employment at 175,105, an increase of 3.3 per cent over September but a decrease of 16.5 from October, 1931.

The bureau also received reports from 42 cast iron pipe plants which gave their October employment at 5749, an increase of 5.3 per cent over September but a decrease of 42.1 per cent from last October.

Ingot Rise Halts; November Is Second Best in 6 Months

PRODUCTION of open-hearth and bessemer steel ingots in November, at 39,031 gross tons daily, developed a moderate decline from the 41,098-ton rate of October, and ended the rally which began in September.

Despite the easier situation in November, which engaged capacity at 18.5 per cent, the month's daily rate and total output both were the largest for any month since May, with the exception of October.

The November total of 1,014,794 tons made an aggregate of 12,251,109 tons produced in the first 11 months of 1932, compared with 23,891,504 tons in 11 months of 1931. Thus far in 1932 steelmaking capacity has been engaged an average of 19.81 per cent, compared with 39.46 per cent in the comparable period of 1931.

These statistics compiled by the American Iron and Steel institute, New York, exclude electric and crucible steel.

In all 1931 the average engagement of steelmaking capacity was 38.13 per cent. In 11 months of 1932 it has been 19.81 per cent, as just noted. Reckoning December as another month of decline, the 1932 average probably will be under 19 per cent, and consequently less than half of 1931.

Hausman & Wimmer Closing

The Hausman & Wimmer Co., Pittsburgh, is being liquidated, the Commonwealth Trust Co., Pittsburgh, having been named permanent equity receiver. H. F. Stocker, formerly with the company, will conduct a scrap business in the same quarters in the Clark building, Pittsburgh.

Columbia Is Low on Bars

Columbia Steel & Shafting Co. Pittsburgh, is low on 29,200 pounds machinery bar steel for the Mare Island navy yard on a total bid of $1083.56, delivered, bids Nov. 1.

Steel Ingot Production — 1931-32

95.33 Per Cent of Industry Reporting
Gross Tons

1931	Open-hearth	Bessemer	Monthly output companies reporting	Calculated monthly output all companies	No. of working days	Approximate daily output all companies	Per cent operation
Jan.	2,098,175	296,620	2,394,795	2,512,140	27	93,042	43.80
Feb.	2,131,079	296,974	2,428,053	2,547,027	24	106,126	49.96
Mar.	2,565,531	346,137	2,911,688	3,054,339	26	117,475	55.30
Apr.	2,321,043	316,668	2,637,711	2,766,959	26	106,421	50.09
May	2,130,805	301,639	2,432,444	2,551,633	26	98,140	46.20
June	1,782,007	246,365	2,028,372	2,127,762	26	81,837	38.52
July	1,574,379	225,030	1,799,409	1,887,580	26	72,599	34.17
Aug.	1,462,254	174,380	1,636,634	1,716,829	26	66,032	31.08
Sept.	1,274,072	199,151	1,473,223	1,545,411	26	59,439	27.98
Oct.	1,319,958	195,943	1,515,901	1,590,180	27	58,896	27.72
Nov.	1,276,856	240,441	1,517,297	1,591,644	25	63,666	29.97
11 mos.	19,936,159	2,839,348	22,775,507	23,891,504	285	83,830	39.46
Dec.	1,068,384	172,046	1,240,430	1,301,211	26	50,047	23.56
Total	21,004,543	3,011,394	24,015,937	25,192,715	311	81,006	38.13
1932							
Jan.	1,230,661	160,633	1,391,294	1,459,450	26	56,133	25.96
Feb.	1,232,568	157,067	1,389,635	1,457,710	25	58,308	26.96
Mar.	1,149,307	193,944	1,343,251	1,409,054	27	52,187	24.13
Apr.	1,036,227	144,197	1,180,424	1,238,250	26	47,625	22.02
May	950,785	103,593	1,054,378	1,106,030	26	42,540	19.67
June	755,123	100,249	855,372	897,275	26	34,511	15.96
July	652,650	102,872	755,522	792,533	25	31,701	14.66
Aug.	696,206	97,323	793,529	832,402	27	30,830	14.26
Sept.	804,556	124,970	929,526	975,061	26	37,502	17.34
Oct.	885,773	132,876	1,018,649	1,068,550	26	41,098	19.00
Nov.	838,559	128,844	967,403	1,014,794	26	39,031	18.05
11 mos.	10,232,415	1,446,568	11,678,983	12,251,109	286	42,836	19.81

Figures exclude crucible and electric ingots. Operating percentages for 1931 on capacity of 66,069,570 gross tons as of Dec. 31, 1930; for 1932 on 67,473,630 tons as of Dec. 31, 1931.

MIRRORS OF MOTORDOM

DETROIT

WHILE the trend toward a small, low price, "pure transportation" automobile to meet an economic necessity has been slow, the January shows may disclose a surprising number of entries in this field.

There will be a Continental four, with a wheelbase shorter than 100 inches and a tread comparable to that of the Essex terraplane; the new Willys four and six, probably the most radically streamlined of any models to be shown; and while his plans continue a mystery, it is not unlikely that Mr. Ford will again seek supremacy in the field in which he won his greatest success.

It is common report in Detroit that the new Continental will be priced at $325 or $350, and that there will be a Ford at about $375. Barring the Austin, the lowest price at which an automobile can be purchased today is one model of the Essex terraplane at $425. For closed cars, the general minimum is $500.

The possibility of mail-order house cars in this market is heightened by the admission of an official of Montgomery Ward & Co. that "such a car is contemplated." And if Montgomery Ward invades this field, Sears, Roebuck & Co. will not be far behind. Both now sell a wide line of accessories; in fact, in some cities everything except a complete automobile.

Await Decisions from Ford

Ford, it is known, has a small four, six and straight eight, in addition to a revision of the present eight, which could be hurried into production. There are evidences at Fordson that, with the return of Mr. Ford from the hospital, decisions are being made. Some small releases for steel have been issued to the local mill, more parts are being placed, and a substantial steel buy is believed near, if dealers and shows are to have the new models in January.

The tentative design of radiator shell for the small cars, which probably will be used regardless of a decision on the number of cylinders, resembles that of the Essex terraplane. An aluminum head, presumably cast, is being considered for the larger eight. It will be recalled that the intake manifold of the present Ford eight, which serves as a cover for the V, is aluminum.

Staggered Cylinders in Six?

There is a report that Mr. Ford has personally reinstated the small six in his program for 1933 and that one of the radical developments which he has been hinting at is an arrangement of the cylinders in a modified V form, the merit being a shorter block and crankshaft and a natural balance to defeat vibration.

Evidence is accumulating that in the forthcoming Fords a smaller proportion of material and parts will be made in Ford plants than in any previous recent model. Under present conditions, it is apparent that specialized plants can manufacture more cheaply than Ford departments, and the search for lower material and parts costs is the most intensive one ever waged by Ford engineers and buyers.

It is understood that, among other things, Ford will roll practically none of the bars required by his own departments or by his parts suppliers for the new models. Some of the ten open-hearth steel furnaces at Fordson may be operated, but the ingots probably will be shipped to a rolling mill in the Detroit district and rolled down into bars and other products. This would be the most revolutionary of Ford developments affecting his raw material.

Chevrolet has definitely informed its dealers that it is bringing out only one line, to be introduced Dec. 17, but the light companion "Mercury" remains in blueprints and the report will not down that Chevrolet will eventually put out a "stripped" job on the new 110-inch chassis.

Mechanically, the new Chevrolet will feature an octane selector, a device on the distributor whereby the timing can be adjusted to the use of competitive or premium gasoline. As much mileage per gallon can be obtained from low price as from more expensive fuels, with the loss in power restricted to 8 per cent. Great economy is claimed for driving in flat country, where a slight reduction in power is not objectionable.

A new type of engine mounting is claimed to arrest vibration in two directions. For an improved transmission a silent speed of 45 to 50 miles per hour in second gear will be possible, and a top speed of 75 miles is expected from the slightly-enlarged 65-horsepower engine. The bodies will be similar to those of Buick, with a V-type radiator shell, fender valances, dovetail rear end, and the divided Fisher windows for ventilation.

Compression Ratios Are Up

Recently it was stated that Cadillac was experimenting with a rotary overhead valve mechanism that would permit a compression ratio of 12 to 1, compared with about 5 to 1 on most current models. The 1933 lines of most manufacturers will show a slight increase in this ratio, and Hudson has experienced some success with a ratio of 8 to 1 in experimental cars.

Incidentally, Cadillac's announcement that its production of 16-cylinder models in 1933 will be limited to 400 is in comformity with the strict budgeting system which General Motors introduced early this year. Related to volume, the carryover of Cadillacs from 1931

into 1932, especially of the sixteens and twelves, was the largest for any General Motors unit, and the recent reopening of the Cadillac plant is virtually the first activity there since mid-year.

The Stutz line for 1933, to be introduced at the January shows, will include sixteens and eights, with emphasis upon a line of single and dual valve eights at $2500 to $3000. There will be no fender valances and rear quarters will not be streamlined as severely as on some other makes, but the windshield has a greater slant.

There will be more steel in the double drop frame of the new Stutzes, and running boards will be steel, integral with the frame. Worm drive is continued in all models, it is understood. On some models there will be a button starter, duplex carburetion, automatic clutch control and mechanism for cooling engine oil in summer and warming it in winter.

Production Estimates Improve

The national automobile chamber of commerce estimate for production of motor vehicles in the United States and Canada in November is 61,216, which compares with the department of commerce official report of 48,934 units in the United States and 2923 in Canada in October.

With Chevrolet alone scheduling 55,000 units this month, although probably falling short of this total on account of delays on bodies, a substantial improvement in December appears a certainty. Buick is slowing down, having made most of its original 7000, and Plymouth is now slightly below 1000 units a day five days a week. On the other hand, such makers as Olds, Willys, Dodge, DeSoto, Cadillac, Hupp, Reo, Pontiac, Hudson are just beginning or are about to begin their assemblies for show and dealer purposes.

Ford's efforts to reduce costs include experiments with hot-rolled sheets for body purposes. Samples have been submitted by most sheet producers . . . . The new Dodge six, like Plymouth, Hupp six and Franklin, has a tubular front axle . . . .The Studebaker-Pierce Arrow Truck Corp. is being discontinued, and the personnel which has been selling Studebaker trucks will become the Studebaker division of the White Co., recently purchased, Jan. 1.

Interstate Bookings Gain

Interstate Drop Forge Co., Milwaukee, in October booked the largest volume of business this year, according to C. E. Stone, president and general manager. Improvement which began in August has been maintained consistently since.

New England Sees Benefit in Shape Price Plan; Eastern News

BOSTON

ALTHOUGH not yet tested by sufficient volume to substantiate definite conclusions, structural steel fabricators in New England are hopeful the new method of quoting structural material, namely, from mill to site, will react to their advantage and tend toward localization of fabricating plain material.

In the past, fabricators in the Boston district have been handicapped in quoting on tonnage for certain points in northern New England because of plural local freight hauls, enabling some outside district mills to put down steel at such points as a result of one charge for a straight haul. It has been impossible, in some instances, to get beyond Portland, Me., in competition with outside shops.

The new ruling is directed at some alleged abuses of fabrication-in-transit business, and, although involved and complicated to some degree, New England shops are hopeful of benefiting. A good part of the structural tonnage going to outside shops during the past two years has gone to two eastern Pennsylvania shops and to one in the Buffalo district.

Fall Improvement Was Good

The bulge in the metal trades during the September-October period, a good part of which has been lost, was greater and more uniform than generally supposed, judging from the index of industrial activity of the Worcester, Mass., chamber of commerce. The largest gains were in September, but the improvement continued the following month.

Taking January, 1928, as 100, employment in the steel and steel products industry was 63 in October, a gain of 2 points over the previous month, while in hours worked, the gain was six points to 51, indicating that the central Massachusetts district operated then, and probably does now, at a rate somewhat above the country as a whole.

Machine tools and accessories gained one point in employment, but in hours worked dropped five points to 38, although in textile machinery gains of two and three points were made in employment and hours worked in October.

Railroads Still Buy Sparingly

Railroad car shops are doing more repairs, but are buying steel sparingly. The New Haven railroad has a locomotive and car repair program considered for the Readville shops, but is understood to have some plates on hand for the work, although some steel is expected to be purchased.

The Boston & Albany shops at Springfield are more active and some plates are being bought. If the beer bill goes through, breweries in the Boston district, will purchase several hundred tons of plates for repairs. Most of the breweries have never gone entirely out of business, having been producing soft drinks, but with the advent of beer, would require extensive repairs.

Shipyards are doing little, although the navy yard is taking some plate steel for destroyer contracts, bids for this material revealing some sharp price-cutting on part of the material.

Plymouth Is Going Modern

Plymouth, Mass., is gradually replacing one of the oldest and most unique water systems in the country. For years the town of the Pilgrims made its own pipe of sheet iron, bending the sheet into a tube and encasing it in concrete. Some of this type pipe has been installed more than half a century and when unearthed, the sheet iron is found to be in perfect condition.

Increased pressures and the passing of time, however, has resulting in gradually replacing the sheet iron pipe with cast iron. Incidentally, Plymouth is extending its system to Manoment, taking hundreds of tons of cast pipe from the New England pipe foundry.

Rowing Tank Is Realistic

The new rowing tank at the Yale gymnasium, designed by the office of Hollis French, consulting engineer, Boston, is the result of engineering which reproduces closely actual conditions the crew meets on the river.

The tank, of reinforced concrete, holds a stationary boat with a water raceway on each side. From the foot tank at the stern two pumps force water through 60-inch pipes on the raceway into the head tank at the bow. Water then flows by gravity into the raceways and past the boat, reaching a maximum velocity of nine and one-half miles an hour.

The pumps, with a 41-inch bronze impeller, are driven by a four and one-half inch non-corrosive steel shaft, each pump having a capacity of 53,000 gallons a minute.

Inertia of the water is a handicap with most indoor rowing tanks, making it impossible to attain a racing speed stroke. This inertia is overcome in the Yale tank by forcing the water past the boat with propellers.

Industrial Men in the Day's News

Andrey E. Potter, President, American Society of Mechanical Engineers

NATIVE of Russia, graduate of Boston Tech, for a quarter century he has been active in engineering in the United States.

HIS bent is for the educational phase. At present he is dean of the engineering schools of Purdue university.

DURING the war he was associated with the naval consulting board, and at one time advised the department of the interior.

ELECTION of Andrey E. Potter to the presidency of the American Society of Mechanical Engineers, as announced at the society's fifty-third annual meeting in New York last week, is in fitting recognition of distinguished service in the engineering profession.

Born in Vilna, Russia, where he received his elementary education and graduate of the Massachusetts Institute of Technology, Cambridge, Mass., in 1903 with a degree of bachelor of science, Dean Potter has been prominent in the engineering activities of this country for more than a quarter of a century, particularly in their educational phases.

From 1910 to 1920 he served as dean of the division of engineering and as director of the engineering experiment station of Kansas State college, Manhattan, Kans., from which five years later he was to receive his doctor's degree in engineering. Since 1920 he has been associated with Purdue university, Lafayette, Ind., as dean of the engineering schools, director of the engineering experiment station and professor of power engineering.

Personnel work has long engaged his special interest, and in the application of this subject to engineering colleges Dean Potter is regarded as a pioneer. In connection with his various educational activities, he was education director of the war deparment during 1918 and 1919, and was associate member of the United States Naval Consulting board from 1917 to 1919.

Dean Potter is the society's representative on the Science Advisory committee in connection with the Chicago world fair. He is a past president of the Society for the Promotion of Engineering Education, of the Kansas Engineering society and of the Indiana Engineering society.

Dean Potter also was formerly consulting expert to the United States department of the interior ,and for three years represented the society on the American Engineering council.

RICHARD A. NORTH, graduate of Yale, for six years on its teaching staff and since 1927 identified with the United States Shipping board and with the Grace Lines Inc., has been appointed assistant chief engineer of the Farrel-Birmingham Co. Inc., Ansonia, Conn. In his recent connection with the Grace Lines he has been technical director to the vice president in charge of operations.

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George M. Kirk, manager of the employes' service department, Colorado Fuel & Iron Co., Denver and Pueblo, Colo., has been honored by the International Rotary club by the inscription of his name on the roll of honor of the club for notable service in personnel and human relations work. Mr. Kirk has been with the Colorado company ten years.

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Lewis Deesz, formerly testing engineer for the Colorado Fuel & Iron Co., Denver and Pueblo, Colo., and since January, 1931, doing engineering work in Russia in connection with metallurgical projects, has been awarded the honor of Udarnich, or the "Lenin Star," by the U. S. S. R.

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Ralph Kelly, formerly southwestern district manager at St. Louis for the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been named central district manager with headquarters at East Pittsburgh. He has been with the company since 1909, and has been in the St. Louis office since 1926. John Andrews Jr. continues as Pittsburgh sales manager.

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A. M. Snodgrass, production manager of the West Lynn, Mass., works of the General Electric Co., has been appointed production manager of the Pittsfield, Mass., plant of the company to succeed C. E. Piper, who has resigned.

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A. E. Lindau, president, American System of Reinforcing, Chicago, has been elected chairman of the joint committee on standard specifications for concrete and reinforced

concrete, on which are represented important technical societies.

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Frank L. Estep, vice president, Perin Engineering Corp., New York, will sail for India Dec. 27. He will make his headquarters at the Tata Iron & Steel Co., Jamshedpur, India.

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D. B. Patterson, sales manager of the Harnischfeger Corp., Milwaukee, has been elected vice-president. The position has been vacant since Walter Harnischfeger became president upon the death of his father, Henry Harnischfeger.

Arthur W. Coppin has been elected secretary to succeed Louis Quarles, resigned. He has been associated with the company since June, 1930, as manager of the credit department and full-time attorney.

W. F. Heilman succeeds Mr. Coppin as assistant secretary. He has been controller since August, 1931.

Here and There In Industry

MERCER TUBE & MFG. CO., Sharon, Pa., recently organized by interests at Sharon and Pittsburgh, has taken over the plant formerly occupied by the American Steel Foundries at Sharon. The plant will be remodeled for the production of pipe, couplings and galvanized work. Operation is planned for March 1. Buttweld pipe and couplings will be the principal output. D. F. H. McDowell, Pittsburgh, formerly of McDowell & Co., is president, B. A. Small, Sharon, vice president and general manager, and Glenn Morrow, Pittsburgh, treasurer and sales manager.

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Advance Pressure Castings Inc., 34-48 North Fifteenth street, Brooklyn, N. Y., has appointed several representatives, as follows: F. X. Morris, 448 Irvington road, Drexel Park, Delaware county, Pennsylvania; L. E. & L. Sales Engineers, 212 Humber building, Highland Park, Mich.; W. R. McDonough & Co., National building, Cleveland; B. J. Steelman, 224 South Michigan avenue, Chicago; A. C. Werner, 5522 South Thirty-seventh street, St. Louis.

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Beck Engineering & Combustion Co., St. Louis, has moved its offices and manufacturing plant from 4525 North Euclid avenue to 2332 Pine street, where it has 3000 square feet more space. V. S. Beck is president and manager. The company manufactures gas burners and heating appliances.

Obituaries

FRANCIS T. F. LOVEJOY, 78, one time active in Carnegie Steel Co., died at Pittsburgh, Dec. 4. He entered the services of the Carnegie steel interests as a clerk and telegrapher in the early eighties. In 1889 he became auditor and stockholder of Carnegie Bros. & Co. Ltd. and Carnegie Phipps & Co. Ltd. Shortly thereafter he was elected secretary of Carnegie Bros. & Co., and in 1890 was named a member of the board of managers of both associations. In 1892 he took an active part in their consolidation, becoming secretary and one of the managers of the Carnegie Steel Co., but in 1900 Mr. Lovejoy resigned all his steel affiliations when he refused to take part in an attack by stockholders upon H. C. Frick, chairman of the board of managers. After conducting compromise negotiations he devised the agreement under which the new company was formed, and was appointed to carry out the provisions of the agreement. For the past 12 years he has been with the Gulf Refining Co. in Pittsburgh.

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Albert DePrez, 65, Shelbyville, Ind., vice president of the Chambers Corp., maker of fireless cooker gas ranges, died recently.

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Adolph Hartman, 80, president, American Metal Ware Co., Chicago, manufacturer of bedsteads and sheet metal stampings, died Dec. 2.

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Kenneth W. Jacobs, 71, founder and president of the Standard Brass Works and the K. W. Jacobs Cooperage Co., Milwaukee, died Nov. 26. Since his retirement several years ago he resided in Clearwater, Fla.

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Edward A. Niven, 59, sales manager for the Pittsburgh district of the American Steel & Wire Co., Cleveland, died Dec. 5, at Pittsburgh. Mr. Niven was a native of Pittsburgh and among other affiliations, a member of the Pittsburgh chamber of commerce.

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Frederick T. Gretton, 69, retired chemist, died at Pittsburgh, Dec. 6. Mr. Gretton was a native of Wales and went to Pittsburgh when 18. In 1883, at the age of 20, he was chief chemist for the Jones & Laughlin Steel Corp., Pittsburgh. He had been retired from active business for some time.

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Bedford Forrest Tyler, 70, purchasing agent of the Gulf States Steel Co., Birmingham, Ala., died Dec. 2, the result of injuries received in an automobile accident Nov. 17. He went with Gulf States on organization of the company in 1909, and prior to that was with Tennessee Coal, Iron & Railroad Co. and Republic Iron & Steel Co.

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Seabury Smith Gould, 44, vice president of Goulds Pumps Inc., Seneca Falls, N. Y., died there Nov. 25. A graduate of Hamilton college in 1911, Mr. Gould entered the sales department of the Gould Mfg. Co., becoming assistant treasurer. Following service in the war he resumed his duties, later becoming a director, a vice president and for the past year serving as secretary.

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James F. Sprague, 72, founder and president of the Sprague Engineering Co., Milwaukee, died Dec. 2 He was a graduate of Massachusetts Institute of Technology and was associated with the B. F. Sturtevant Co., Boston, and the Automatic Heating Co., Chicago, before going to Milwaukee to become chief mechanical engineer for the Bayley Blower & Mfg. Co. He founded his own firm in 1924.

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Louis J. Petit, 76, widely known Milwaukee capitalist, died Dec. 2. At one time he was principal owner of the Norrie and Pabst iron mines in Upper Michigan, these having been the first mines ever to reach 1,000,000 tons annual output. The mines, with several ore steamers, were sold to the Carnegie Steel Co. From 1904 to 1919 he was president of the Wisconsin National Bank of Milwaukee.

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George H. Isley, 50, manager of the combustion control department, Morgan Construction Co., Worcester, Mass., died Nov. 30. In 1906 he entered the employ of the Morgan company as a draftsman. For many years he was active in the gas producer department of that company, where he contributed a number of inventions and patents to the development of the producer gas machine. In 1917 Mr. Isley became interested in the improvement of high temperature furnaces and soon centered his attention upon the development of a high-grade reversing valve. Although a complete mechanical and practical success, after making a number of installations, his acute sense for simplicity and directness inspired him with the idea of completely eliminating the reversing valve, so-called, by the Isley system of regenerative furnace arrangement and operation. He was a member of the American Society of Mechanical Engineers, associate member of the American Iron and Steel institute, and a frequent guest of the open-hearth committee of the American Institute of Mining and Metallurgical Engineers.

$100,000 for Allegheny

Allegheny Steel Co., Pittsburgh, has told the national committee on industrial rehabilitation it will spend $100,000 for improvements.

EDITORIAL

Industry Needs More Accurate Data on Employment

CONTINUING the discussion of technological unemployment where we left off in this column last week, it will be in order to examine trustworthy figures on the postwar trend of employment. The following table is derived from government figures and from annual reports of the United States Steel Corp.:

Average Number of Workers Employed Annually

	Per $1,000,000 of value added (all manufactures)	Per 1,000,000 tons bituminous coal produced	Per 1000 automobiles produced	Per 1000 tons finished steel U.S. Steel Corp.
1921	441	1,595	133	25
1922		1,630		19
1923	388	1,247	100	18
1924		1,280		22
1925	360	1,131	100	19
1926		1,036		18
1927	350	1,146	108	18
1928		1,042		17
1929	320	940	83	16

Discarding 1921 figures as abnormal (due to lowered efficiency in a depression year) and comparing 1929 with 1923. we find that decreases in employment per unit of output range from 24 per cent in soft coal, to 17 per cent in automobiles and "all manufacturing," to 11 per cent in the Steel corporation. It is clear that unless output continues upward annually in a degree sufficient to offset these declines there is bound to be unemployment, insofar as these industries are concerned.

Technological Unemployment Not Serious Problem Until Postwar Period

This situation is not new; it dates from the beginning of the industrial age. In the United States, the problem of technological unemployment did not assume importance until after the World war. Up to that time new industries absorbed workers more rapidly than they were displaced in older industries and thus the problem was solved automatically.

But from 1920 to 1927 absorption did not keep pace with displacement. During that period about 825,000 emplcyes in manufacturing enterprises were forced out of work. Meanwhile the number cf unemployed among workers depending upon manufacturing for a living increased by 240,000. On the basis of these figures, the report on "Recent Economic Changes" of the President's committee on unemployment, assumes that 585,000 cf the 825,000 displaced, or 71 per cent, were absorbed in other lines of work. It is well to remember that during the postwar period employment gained in every important nonagricultural occupational division except manufacturing. Nevertheless up to 1927 nearly a quarter cf a million displaced workers had not been absorbed in other pursuits.

The fact that such unemployment could exist in time of prosperity, as in 1927, 1928 and 1929, is a challenge to the nation. It is a challenge that cannot be met by hurling invectives against the "machine age," by exaggerating the plight of the victims of unemployment, nor by expounding untried theories. Many decades of history afford proof that methods promoting higher efficiency, while they may result in a temporary diminution of employment, in the long run enlarge the demand for labor and increase its rewards. The problem is not to change or curb technological development, but to adjust to its requirements.

Meager Information on Employment Retards Intelligent Corrective Action

First among the requisites for intelligent action are reliable statistics on employment. We have developed statistical services which show accurately and promptly the flow of goods and money, but we still have to guess about many important details concerning the whereabouts of the nation's manpower. The need of data on employment in public institutions, mercantile houses, hotels, domestic service, etc. is especially acute.

Given figures that show accurately quarterly or monthly fluctuations in employment, a remedy can be prescribed. The facts may show that in certain trades, greater mobility of labor is desirable and that employment agencies of different character than those now in existence may be required. Greater flexibility in working hours and in the days per week of normal operation may be indicated as necessary. The facts also may be expected to show whether or not decentralization of certain industries is a logical development. Accurate statistics would prove invaluable to industry as a guide in establishing many important policies.

As long as the country has to depend upon the present patchwork of employment figures, alarmists and agitators will continue to flood the public with propaganda and hysterical demands based upon exaggerated statements of the situation. Basic information, aside from defining the problem, will serve as a guide to its ultimate solution.

THE BUSINESS TREND

Industry Is on Defensive To Hold Past Gains

NOVEMBER business statistics rather definitely indicate that the momentum of the late summer upturn has practically disappeared. While certain barometers show that industry is resisting strongly the seasonal downward pressure, the bulk of evidence is disappointing.

Pig iron output in November was 625,663 gross tons as compared with 644,648 in October, but the daily average in November, 20,855 tons, held a slight advantage over the 20,795 figure for the tenth month. This somewhat negative showing is in spite of a net gain in active stacks of four in October and one in November.

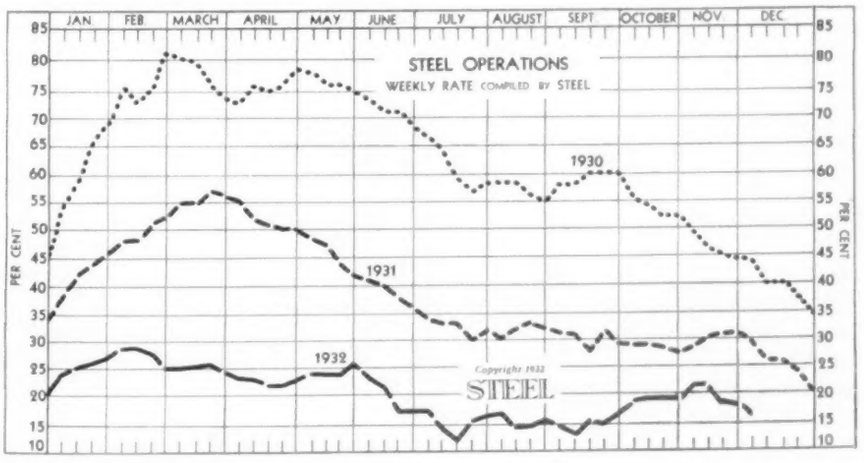
The slackening pace of production was reflected even more decisively by the report of the American Iron and Steel institute on steel ingots. Calculated output in November was 1,014,794 tons as compared with 1,068,550 in the preceding month. The daily average for November was 39,031 tons, a decline of 2067 from the daily average of 41,098 in October. The rate of operations in November was 18.05 per cent of capacity, as against 19 per cent in the preceding month.

While the output of soft coal in the week ended Nov. 26 declined on account of the Thanksgiving day lull, the daily average output gained, and thus for the second week in succession the 1932 output has topped that of the corresponding period in 1931. Freight car loading dropped sharply in the week ended Nov. 26 but again the margin of deficiency from the corresponding week of 1931 was only 65,000 cars, whereas for about 10 months that margin has exceeded 100,000 cars weekly.

Business Battling Hard To Retain Part of Last Summer's Gains

Further weakness in commodity prices has forced Bradstreet's index for Dec. 1 down to $6.89. Thus two-thirds of the gains since last May have been wiped out. The index for Dec. 1 is higher than for June, July and August.

Industrial activity still holds to a level appreciably above the low point of last July or August. If part of the fall gains can be retained throughout the seasonal period of year-end dullness, there is hope that the first-quarter of the new year will carry industry to a slightly higher plateau of activity.

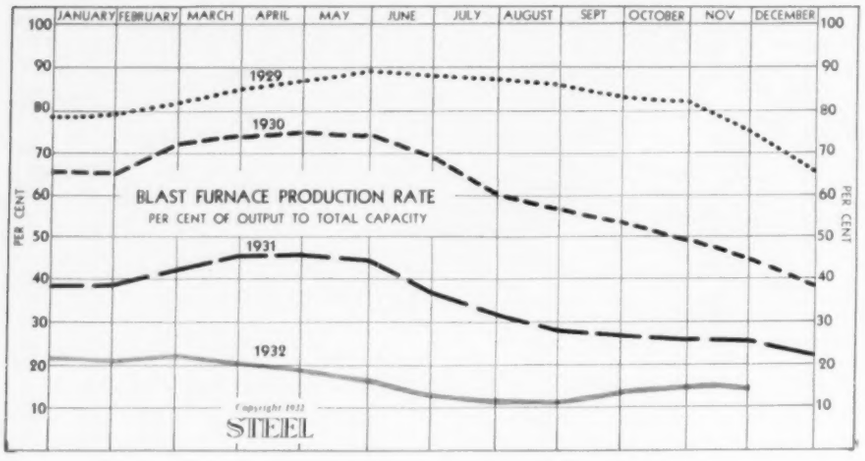


1932

	Per Cent
Dec. 3	16
Nov. 26	17.5
Nov. 19	19
Nov. 12	21
Nov. 5	21

1931

	Per Cent
Dec. 5	26
Nov. 28	29.5
Nov. 21	31
Nov. 14	31
Nov. 7	31



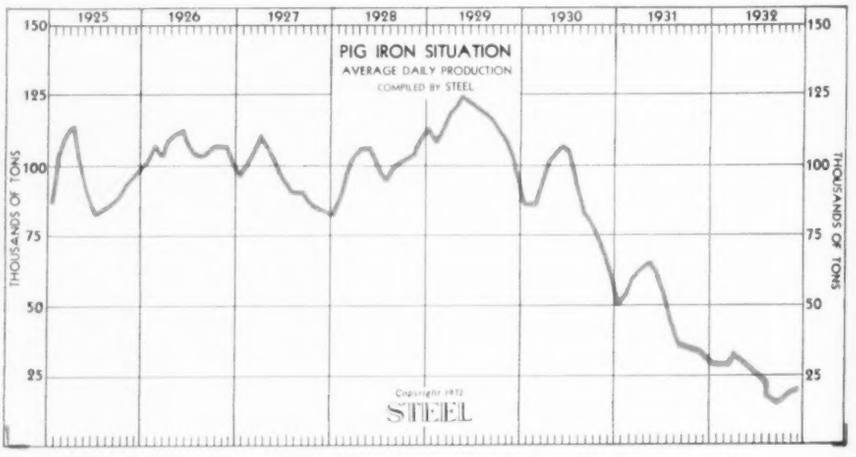
	1932 Per Cent	1931 Per Cent
November	14.7	25.5
October	14.7	26.3
September	14.0	27.0

Blast Furnace Activity Is Unchanged in November

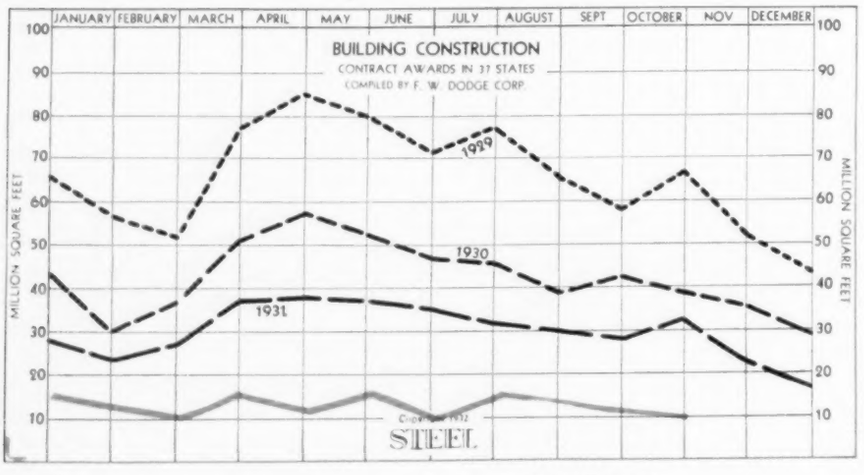
With one more stack added to the active list of furnaces during November, blast furnace activity continues to hold the ground gained since the upturn in August. Relating roduction to capacity, the operating rate for November stood at 14.7 per cent, the same as for October. In November last year the operating rate was 25.5 per cent. During November, three furnaces were blown in and two were banked, making a total of 51 active furnaces.

Gain in November Iron Output Small

Although the average daily production of coke pig iron in November exceeded the output in October by only 60 tons, this slight gain represents the third consecutive upward movement of this trend. Average daily production in November was 20,855 gross tons, or 0.29 per cent better than the 20,795 tons of October. In November, 1931, iron was produced at the rate of 36,727 tons per day.



	1932	1931
November	20,855	36,727
October	20,795	37,831
September	19,788	38,947



	Square Feet
October, 1932	11,033,700
September, 1932	13,513,900
October, 1931	30,700,200

Building Awards Decline Slightly in October

Building construction, as measured in new floor space, declined over 2,000,000 square feet in October, according to the report of the F. W. Dodge Corp. Awards in 37 eastern states involved 11,033,700 square feet in October as compared with 13,513,900 in September and 30,700,200 square feet in October last year. In valuation, residential building showed a contraction from the September contract total amounting to about 4 per cent, while non-residential suffered a decline of about 25 per cent.

DESIGNING STEEL CASTINGS FOR ECONOMY IN MANUFACTURE

Part I

By F. A. LORENZ Jr.

American Steel Foundries

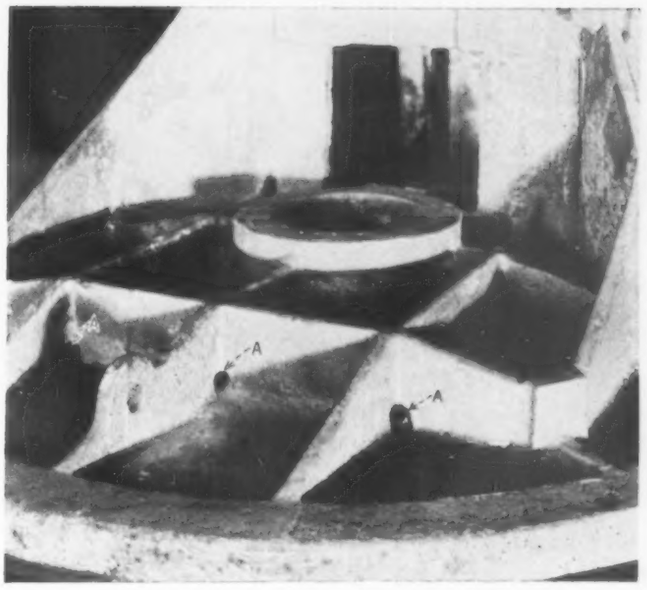


Fig. 1—Holes used to reduce concentration of heat at junction of cross ribbing and body of the steel casting

STEEL castings lend themselves with great facility to the varied necessities of design. The wide range of their application in industry indicates the dependence placed upon them. This range grows greater as the designer and the foundryman reach a better understanding of their related problems and as the objectives of the one are conditioned to meet the facilities and technique of the other.

It is not necessary that the foundryman be qualified as a designer, nor that the engineer be versed thoroughly in foundry practice. The common ground of their interest is the most economical production of a casting which embodies the desired characteristics of utility and appearance. Economic considerations justify whole-hearted co-operation that penalties of high production costs and impaired soundness may be avoided.

There is a tendency among foundrymen to devote their energies to production of designs as submitted, without bringing to the attention of engineers features which impose high production costs. This failure leaves the designer ignorant of economies which could be effected. Occasionally, when the designer is prompted by economic reasons to resort to a fabricated or forged substitute, he finds that radical changes in construction are involved, to accommodate limitations of the manufacturing process selected. It is quite possible, that, had the foundryman presented his requirements for economical production, suitable alterations in the design would have been made. It is also possible that the designer would have been able to retain desirable features which he was forced to sacrifice in the substitute.

To the designing engineer belongs the initiative in bringing about co-operation between himself and the foundryman. Originating in his mind, the design is developed and ultimately presented to the foundryman for his quotation of price. Too frequently the design is developed with no great consideration of changes which might reduce the cost of production or of modifications which would improve the ability of the casting to withstand the stresses imposed in service. These are important considerations, and much benefit may be gained if the broad fundamentals of steel founding are understood by the engineer, or if he will avail himself of information which a steel foundryman can give.

It may not be an exaggeration to state that it is as essential in developing a design to understand the characteristics and behavior of steel in the mold as to know its characteristics and behavior under working conditions. The

Fig. 2—Two views of a steel casting showing the methods employed in producing a more uniform rate of cooling

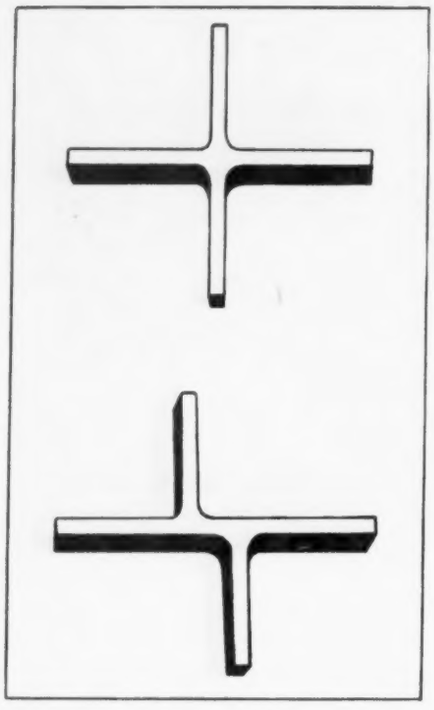


Fig. 3—In the sketch of a casting shown above, fillets provide for heat transmission. Sometimes, however, it is desirable to reduce mass by a staggered section such as shown in the lower sketch

stresses set up in cooling, the starvation of obscure sections, the influence of one section upon another, and the numerous factors entering into production of steel castings bear strongly upon cost and ability of the casting to meet conditions of service to which it will be put when completed.

Temperature at which steel for castings is tapped from the furnace is usually in excess of 2800 degrees Fahr., the nature of the castings to be poured regulating requirements of temperature. Castings of heavy section may be poured with metal of lower temperature than can those of light section, requiring very fluid metal.

Chilling Effect Forms Skin

Although the loss of heat begins immediately upon tapping the metal from the furnace, the most drastic drop occurs at the instant of contact of the metal with the surfaces of the mold cavity. The chilling effect of this contact causes the instantaneous formation of a skin of solidified metal. The casting for a short period consists of a shell, the interior of which is filled with fluid metal. Fig 5 shows a section of a simple block which was bled by breaking an opening 15 seconds after pouring was complete. This illustrates the rapidity with which the shell of solidified metal is formed.

Steel, as it solidifies, forms crystals, and the shell created by contact with the mold surfaces is of crystalline structure increasing in thickness as the temperature of the interior, due to loss of heat through the shell, reaches a point where additional crystals are formed upon its inner surface.

This formation of crystals also involves a contraction as the change from the liquid to the solid state takes place. Action of formation of crystals is progressive and takes place from all directions toward the center. That area, being the last to solidify, continues to supply the demands for material until it is exhausted. In the absence of a source from which it, in turn, may draw needed material, the demand goes unsatisfied and a shrinkage cavity results. Fig. 6 shows a section through a block which was allowed to solidify with no provision for supplying the material needed to compensate for shrinkage.

Proper Feeding Is Essential

This necessity for adequate feeding should always receive the serious attention of the engineer. If it is not possible to incorporate uniformity of section in the design, location of heavy sections should be such that they may be supplied readily with material from conveniently located risers, or be fed through an adjacent section of sufficient bulk. In general, sections located in the lower parts of the mold draw material from those sections immediately above them. These are, in turn, fed from the surplus provided in the superimposed risers. Invaluable assistance can be rendered in production of sound castings if, in designing, the sections are arranged to facilitate proper feeding.

Fig. 4 indicates the manner in which the locations of sections, in relation to others, influence the ultimate soundness of a casting. The casting is represented by sections A_1-A_2, B-B_1, C-C_2, and the risers by A and C. In cooling, A_2 is fed by A_1, which, in turn, receives material from riser A. Sections B and B_1 due to their lightness, cool almost instantaneously and require little feeding. Such material as is needed is supplied by the adjacent sections. The location of heavy section C_2 below the lighter section C_1, effectively shuts off its supply of material. The provision of excess metal in riser C is ineffective, because C_1 is lighter than C_2, and solidifies before the latter. The result is the shrinkage cavity at D.

A comparison of the rapid, almost instantaneous solidification of thin sections, with the slower, progressive freezing of heavy sections, indicates that the capacity of surrounding sand for carrying away heat is limited. This also is shown by the boss on the bled casting in Fig. 5, which has progressed much further in its solidification during the same time interval, than has the block proper. The surface area of the boss is greater, in proportion to its mass, than that of the body of the block. Its proportion of radiating surfaces to the volume of heat in its mass permitted rapid cooling.

Design for Uniform Cooling

Fig. 5 shows, in addition to what has been mentioned, the effect produced by connecting members. The sand which formed the sharp corner at the junction A of the boss with the block, was called upon to transmit heat from the surface of the boss, as well as from the surface of the block. The double duty imposed upon this area was greater

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CERTAIN factors of design are germane to each method of fabrication, and the industry which best applies the fundamental principles pertaining to design secures a decided advantage over competing methods. This is true in steel castings. Here a knowledge of the characteristics and behavior of the steel in the mold and the practical application of the information in the conception of the casting, will result in economies of manufacture. Continual co-operation between the designer and foundryman is necessary to accomplish the desired purpose.

This article, the first of two parts, is from a paper presented at the symposium on steel castings before the joint meeting of the American Foundrymen's association and the American Society for Testing Materials at Atlantic City, N. J., in June. The author is general manager, industrial division, American Steel Foundries, Chicago.

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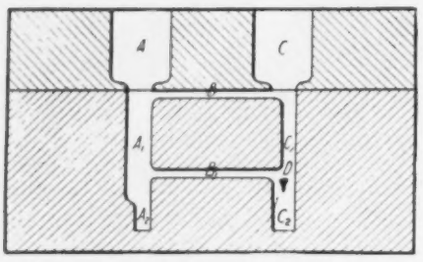


Fig. 4—A sketch showing how the locations of sections in relation to others influence the ultimate soundness of a casting

than its capacity, and the lag in transmission is evidenced by the thinness of the skin at the juncture. Though the time interval was but 15 seconds, the effect of retardation is quite evident.

The same tendency exists at junctures of all sections and is likely to be evidenced in the form of a shrink unless proper precautions are taken to reduce abruptness of the union. The simple expedient of providing suitable radii at such points serves to increase the area of radiating surfaces, and provides for an approximately uniform cooling rate throughout. This method is shown in Fig. 3. The introduction of properly proportioned fillets, by eliminating sharp corners of sand, provides surfaces capable of more rapid heat transmission than otherwise could be effected.

Sections May Be Staggered

There are occasions when such a junction, because of the size of the sections, creates a mass of such size as to require the use of risers to insure solidity. Such a condition, and incidental difficulties tending to cause shrinkage cracks, often may be avoided by staggering the sections, as shown in Fig. 3. Cross-ribs, the functions of which are largely those of reinforcement, particularly lend themselves to this form of relief.

Fig. 1 illustrates an expedient adopted to reduce the concentration of heat at the junction of the cross-ribbing and the body of the casting. Normally, risers would be required at these points to insure solidity. Instead, relief cores, *A*, were placed to provide the openings shown, thereby reducing the mass at the point of heat concentration, and providing a relatively uniform rate of cooling. There are numerous instances in which such troublesome masses can be reduced by variations of this procedure, with no sacrifice of strength, and often with distinct advantage to the resistance of the casting to severe stresses.

A variation of this method of relief is shown in Fig. 2. The casting was molded in the vertical position, with the ring up. The two views indicate the ways in which the members were relieved by openings, while sharp corners were eliminated. The result was a component of a machine which combined lightness of weight and great resistance to severe stresses. Serious strains were not induced in the solidification of the steel because the design accommodated itself to contraction phenomena.

(To be Concluded)

New Metals for Turbine Service

IN THE last few rows of blades in large turbines, severe erosion of the blade material takes place along the back of the inlet edge of the blades, and it has been found that a coating of the cobalt-tungsten-chromium-iron alloy, stellite, to the affected area, greatly improves the life of the blades, according to research work carried out by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Other Alloys Find Applications

Many other corrosion-resisting steels and alloys have been used experimentally for turbine blades, and there are and will be special service conditions where the nickel-chromium types find application. Entry nozzles or nozzle block of turbines have long been made of bronze, and later, as higher temperatures were reached, of copper-nickel alloys. More recently, many of these nozzles have been made of forged stainless steel, similar in composition to the blading material. For small turbines, stainless steel casings have been developed of several grades, to meet the various service conditions that may be encountered. Some fabricated nozzles have been developed, in which the nozzle passages are machined from stainless steel, and the inner and outer casings of carbon steel.

Turbine valve construction is another place where several corrosion and temperature-resisting materials are used. Monel metal or stainless steel valve stems and valves operate in nitrided steel guide bushings and cages. Both forged and cast corrosion-resisting steel have been used for valve construction, depending on the design. Recently, a new development was made, whereby corrosion and erosion resistant seats were welded on cast carbon steel valves.

Recent rubbing or wear tests, made in connection with materials for turbine gland and dummy sealing strips, resulted in the development of a modified stainless steel which was found highly satisfactory.

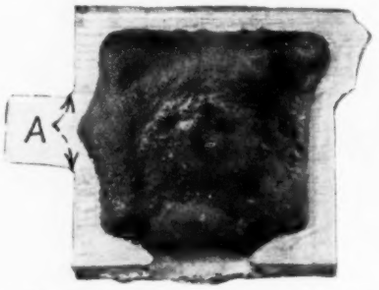
For a long time lashing wires for turbine blades have been of pure nickel and chromium steel. More recently, one of the new stainless steels containing copper and higher silicon has been used for the purpose, in tubular form, and secured to the blades by electric welding rather than the older silver soldering method. Nitrided steel is being applied to many parts, and in a sense is considered as a resistant material.

Booklet Outlines 300 Uses For Stainless Steels

Among the best-known and most widely used of the alloy steels is the comparatively large group of chromimum and chrome-nickel steels generally called stainless steels. These steels contain from 12 to 20 per cent chromium, with or without additional alloying elements. Of these, the 18 per cent chromium, 8 per cent nickel steel is probably the most widely used at the present time.

These steels are particularly well adapted for use in resisting atmospheric corrosion, attack from oxidizing agents, and scaling at elevated temperatures. Because of their good physical properties and broad range of corrosion resistance, they are continually finding new uses in practically every branch of industry.

A brief summary of the major applications of the heat and corrosion-resisting alloy steels, is presented in a 20-page illustrated booklet, "Stainless Steels and Their Uses," recently published by Electro Metallurgical Co., 30 East Forty-second street, New York. Copies will be furnished upon request to the company.



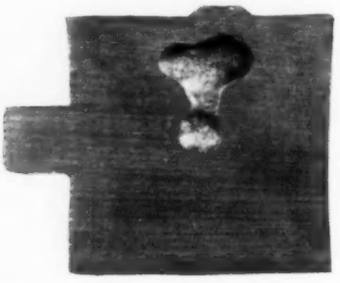
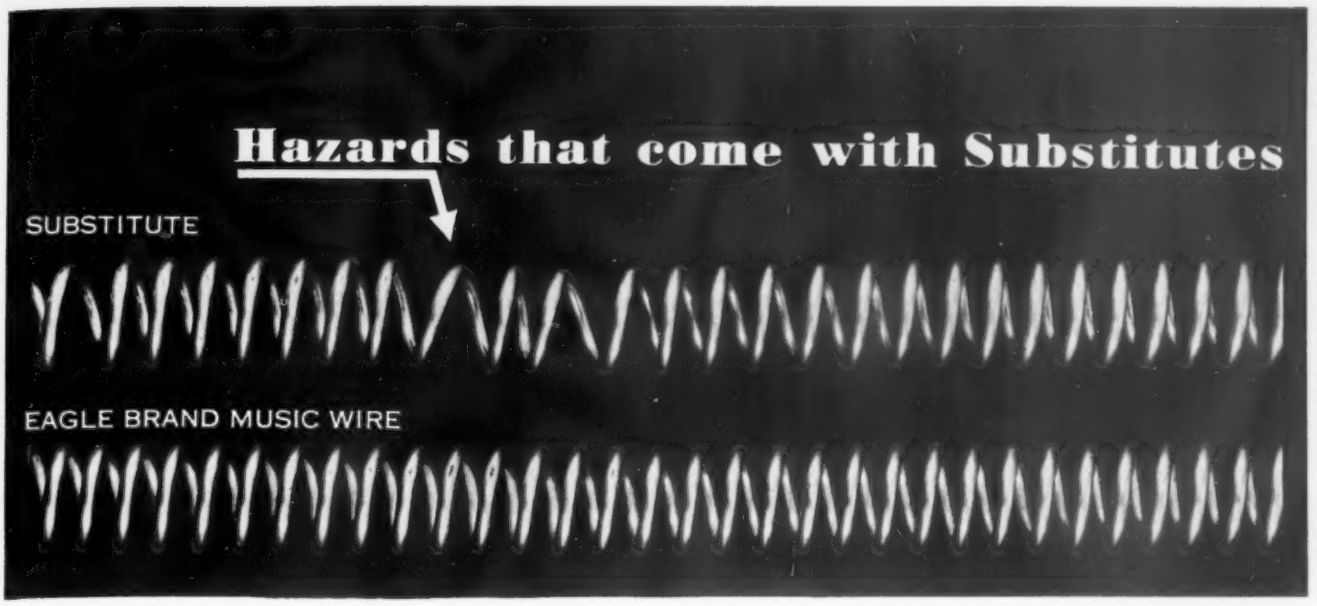


Fig. 5 (Left)—A casting shell formed by bleeding 15 seconds after pouring. Fig. 6 (Right)—A section showing a shrinkage cavity



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Technical Progress in Iron, Steel Outrun Depression

NOTWITHSTANDING record low operations, exigencies of the depression have stimulated advancement in the technical and economic phases of iron and steel manufacture, according to a progress report submitted by the iron and steel division of the American Society of Mechanical Engineers at the fifty-third annual meeting of the society in New York, Dec. 5-9.

While a full measure of what is being accomplished cannot be taken until operations are more nearly normal, progress is clearly apparent, particularly in blast furnace and rolling mill practice. Varying degrees of technical development were reported in other lines allied with the steel industry.

Symposiums Arouse Interest

Of special interest were discussions presented at two symposiums on working stress, and a session devoted to soaking pits and radiant heat. Cutting tool materials and metal cutting methods, bearings, lubrication testing and castings were subjects covered in additional technical sessions.

Conrad N. Lauer, Philadelphia Gas Works Co., Philadelphia, delivered the presidential address as retiring president of the society; his subject was, "Unifying the Engineering Profession." A. W. Robertson, chairman of the board of directors, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and chairman of President Hoover's committee on industrial rehabilitation, presented the fifth Henry Robinson Towne lecture, speaking on "The Scientific Approach to Human Affairs."

Formation of the Engineers' Council for Professional Development was announced by Mr. Lauer. The purposes of the new council, he declared, are to "co-ordinate and promote efforts and aspirations directed toward higher professional standards in engineering education and practice, to enhance the prestige and solidarity of the engineering profession and to secure greater effectiveness in dealing with technical, social, and economic problems." Seven engineering bodies have acted jointly in the development of the council.

In the previous mentioned report of the iron and steel division, "slow blowing" of blast furnaces as a permanent rather than an emergency measure was declared an important development in pig iron manufacture during the past year. With demand for tonnage declining over a period of almost three years, slow blowing, or blowing a furnace at a rate somewhere below the point of maximum production, has been pressed to the utmost, with the result that today many stacks are being driven at

(Continued on Page 57)

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Exhibits at Power Show Disclose Noteworthy Engineering Developments

THAT engineering development and mechanical improvement have not been lagging during the current period of depression was borne out by some 300 exhibits at the National Exposition of Power and Mechanical Engineering at Grand Central Palace, New York, last week. Steel and alloys of steel, especially the latter, were accorded prominent places in the displays of mechanical and power transmission devices, the commercial uses of which are slowly increasing despite unfavorable conditions.

Nonferrous alloys also were featured in the exhibit, several of the copper and brass companies displaying new products. One, a thin sheet of electrodeposited copper, was offered for roofing, the thin metal sheet being backed with fabric.

Appliances in All Sizes

Power appliances of all types, devices for eliminating smoke and dust from commercial and industrial plant stack gases, arc welding machines, gears, valves, bearings, turbines, generators, gages and other mechanical equipment, in size from a valve 3/16-inch in diameter to turbines 12 feet square and weighing more than a ton, were displayed.

For the accurate control of high pressure an interesting valve was displayed, applicable to modern boiler and steam turbine plants using high-pressure steam. Electrically controlled air-blowing equipment, supplying a constant weight of air to iron foundry cupolas, regardless of atmospheric conditions and furnace resistance, was shown. This apparatus was claimed to provide better control of the foundry melt, setting the blower for the calculated weight of air required, the shutoff being made automatically when the desired point is reached.

Aim for Precision Control

Among the three floors of exhibits of power generators and distributing systems were numerous devices for obtaining higher pressures and temperatures of operation, with increased precision in controlling them and in taking out vibration at high speeds.

To keep central offices informed of production rates at any distance, a foundry has developed a chronoflow meter which sends a record over an ordinary telephone wire without interfering with conversation which may be in progress at the time. This chronoflow meter, registering the flow of millions of gallons of water into New York through the Catskill aqueduct, was shown in operation.

Among the numerous applications of the photoelectric cell, or "electric eye," was an electric rod heater (STEEL, Nov. 7, p. 26). Another machine attracting considerable attention was a device termed "nearly perpetual motion," comprising a small vapor turbine plant operated without any external supply of energy (STEEL, Nov. 21, p. 25).

IMPROVING OPEN-HEARTH FURNACE DESIGN

By WILLIAM C. BUELL JR.

Part III—Roofs and Their Supports

(Eleventh Article of Series)

PROPER design and construction of an open-hearth roof system is of utmost importance to an economical and lengthy furnace campaign. A severe partial failure or the complete collapse of the roof or the arrival of the roof at the point where failure may be expected, usually marks the time when the furnace is taken off production for a major rebuild and thus ends a campaign.

While combustion and charging practices, be they good or bad, to considerable degrees are responsible for a lengthy or brief campaign, the design and construction of the roof system undoubtedly play much greater roles in the length of campaign than usually is credited to those factors.

Roof Life Important

A major rebuild usually keeps the furnace off production for two weeks to a month. While the cost of the replacement of the roof itself is high, the capital carrying costs of the furnace and its contingent plant and equipment, which in a modern plant may be represented as interest, depreciation and taxes on an investment of nearly a million dollars, constitute a charge against the furnace which may be higher than the cost of the rebuild itself. Therefore, any factor offering a possible increase in the length of the campaign should be investigated.

Other Phases Are Essential

Granting that design and construction are but two of several phases that govern roof life, an understanding of those factors involved in design and construction, the incorporation of sound engineering in design and the application of quality artisanship in construction, will tend to materially lower ingot costs. They also will give the designing engineer a sound basis to combat the frequent alibi of the operating man to the effect that "the roof design was poor."

This and subsequent installments will discuss the construction and properties of the roof systems of the newer furnaces now installed, the economics and use of the materials at present available and finally will suggest a roof system conforming to and incorporating the best in design, based on the data as analyzed and developed.

The term "roof system" is used as descriptive nomenclature. As taken, it is presumed to include, (a) the silica brick roof or arch; (b), the refractory skewback brick and the horizontal supporting members which form the arch abutments; and, (c), the buckstays and their top and bottom ties which form the roof supporting and furnace binding members about the transverse furnace section. Each of these subjects will be treated individually.

Where Sections Are Located

The cross sections of the furnaces under discussion are shown in Fig. 21. These sections are presumed to be taken between any set of buckstays that show the interior cross sectional area at its maximum. Excepting that the tap hole is absent, the section may be considered as at the hearth center line.

Certain data pertaining to the roofs of the furnaces, Fig. 21, and germain in the discussion of the roofs has been tabulated in Table XXVIII. All furnaces listed in this table with the exception of E and G, employ ribbed roofs. It is doubtful if any new furnaces would be designed with other than ribbed roofs, since their value now is taken for granted. The principle upon which the ribbed roof is predicated is that at intervals, to occupy about one-fourth of the roof length, a course of brick 2½ to 6 inches deeper than the balance of the roof is laid between courses of roof brick of usual depth.

The extra depth of the ribs extends above the top surface only, thus leaving the inner or hot face of the roof as a smooth surface. Since through use, the depth of the roof brick decreases and the entire structure tends to weaken, the ribs with their greater depth exercise a considerable strengthening effect to the entire roof and lengthen its life appreciably.

In Table XXVIII roofs having a

Table XXVIII

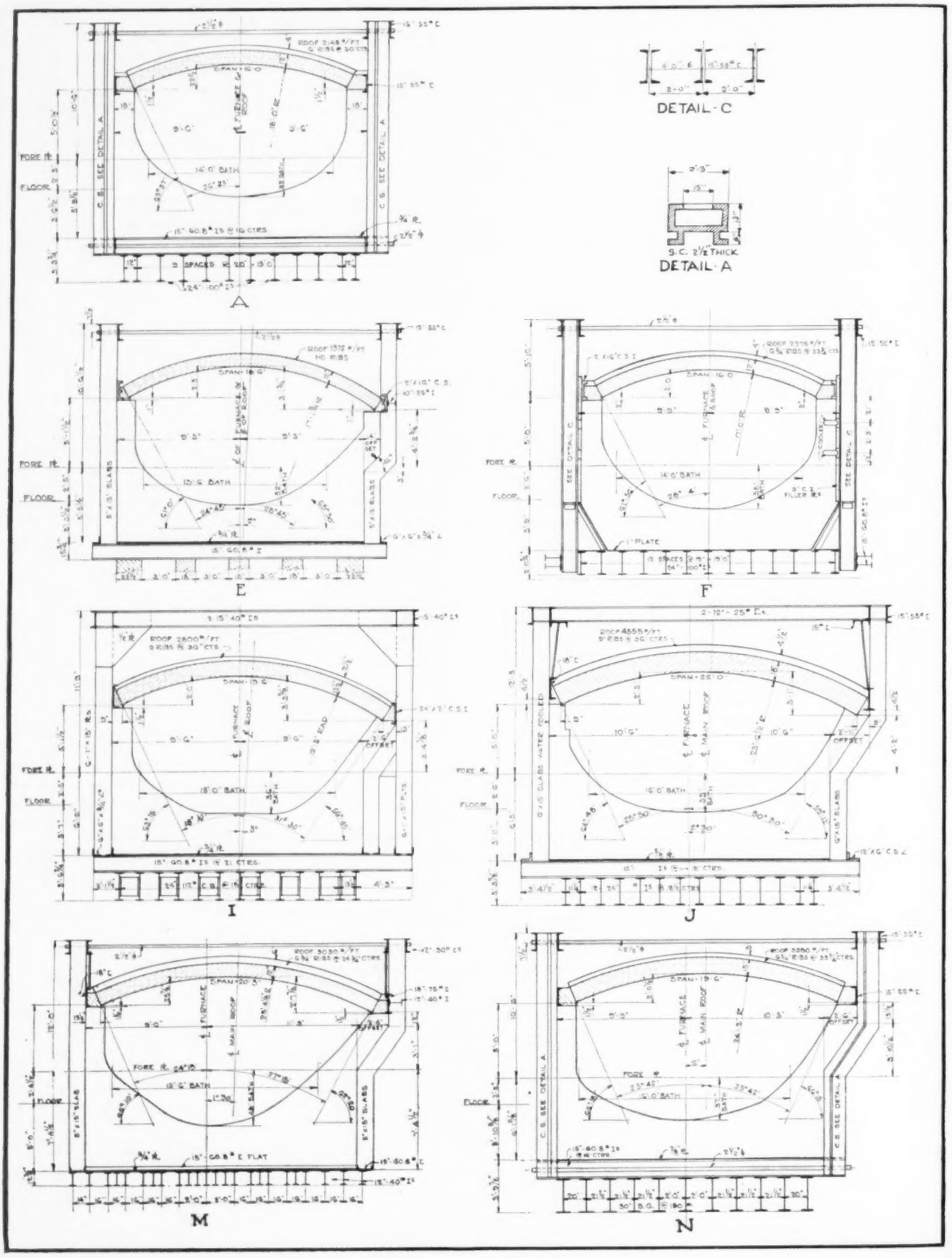
Data on Open-Hearth Roof Refractories

Furnace	Roof span, ft. - in.	Centers of ribs, inches	Thickness of roof, inches	Width of brick used, ft. - in.	Thickness of ribs, inches	Width of ribs, inches	Weight per rib section, pounds	Centers of buckstays, ft. - in.	Weight per buckstay section, pounds	Included angle, deg. - min.
A	16 – 0	30	12	4 – 6	16	6	5,360	8 – 1	17,160	52 – 46
C	21 – 7½	36	18	3 – 9	22½	9	12,660	8 – 4	35,150	60 – 0
D	18 – 0	24¾	13½	3 – 6	18	6¾	6,560	7 – 11¼	24,440	61 – 10
E	18 – 6	None	12	0 – 6	None	None	1,972*	8 – 0	15,776	53 – 30
F	16 – 0	33¾	12	3 – 9	16	6¾	6,680	11 – 6	27,310	56 – 8
G	18 – 0	None	15	0 – 6	None	None	3,165*	8 – 3	26,100	49 – 40
H	19 – 6	27	18	3 – 6¾	22½	6¾	9,580	7 – 7½	32,480	58 – 30
I	19 – 6	36	13½	3 – 9	16	9	8,400	8 – 9	24,500	60 – 0
J	22 – 0	36	18	3 – 9	22½	9	13,665	8 – 2½	37,420	56 – 0
K	20 – 3	27	18	3 – 6¾	22½	6¾	9,910	9 – 0	39,645	58 – 30
L	18 – 10½	36	18	3 – 9	22½	9	13,780	8 – 2	34,750	70 – 38
M	20 – 3	24¾	12	3 – 6	18	6¾	6,245	7 – 11¼	24,000	51 – 30
N	19 – 6	33¾	15	3 – 9	18	6¾	9,510	8 – 1	27,320	47 – 24
O	21 – 9	33¾	15	3 – 9	18	6¾	10,120	8 – 4	30,000	46 – 16

*Roof weight per foot of roof length.

thickness of 12, 13½, 15 and 18 inches are listed and if 16 inches is added, then all standard brick lengths available or desirable for open-hearth roof construction are included. Ribs are shown as 16, 18 and 22½ inches deep which, with 20 inches depth added, comprise a complete list. All bricks in these lengths for roof construction may be secured regularly from makers as of 6 or 9 inches in width.

The 6¾-inch width shown in connection with a few roofs is not regularly listed by the brick manufacturers. The thickness of all the



bricks listed is based on the 3-inch "straight" brick.

At present there appears to be a decided trend towards the 18-inch roof with 22½-inch ribs, at least for furnaces rated at 150 tons or more. The total weight of the roof to be supported on any pair of buckstays and which of course varies with the thickness, radius and span of the individual roof and the spacing of the buckstays varies from about 16,000 pounds, (furnace E); to about 40,000 pounds, (furnace K).

(To be continued)

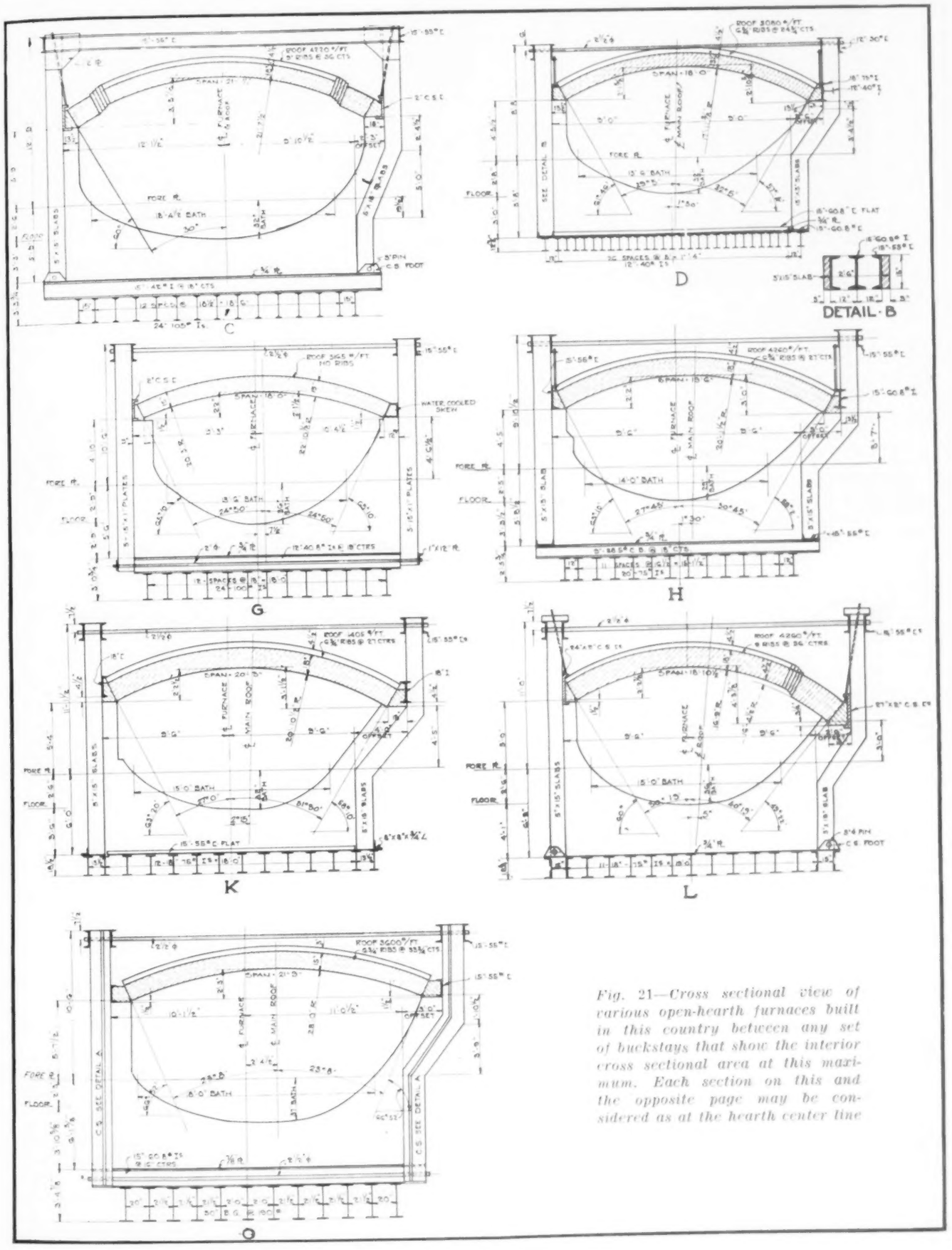
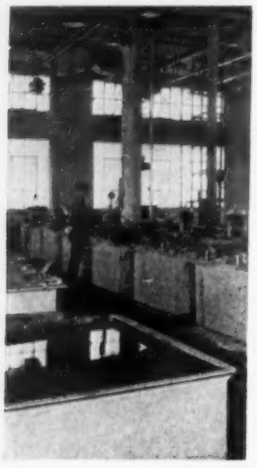


Fig. 21—Cross sectional view of various open-hearth furnaces built in this country between any set of buckstays that show the interior cross sectional area at this maximum. Each section on this and the opposite page may be considered as at the hearth center line

Making the Most of



METHODS AND MATERIALS

BY INSTALLING immersion gas heating in its cleaning tanks, formerly fired with atmospheric pipe burners, an Eastern electroplating works specializing in chromium plating has effected a saving of 40 per cent in gas consumption alone during a six-month period. These tanks are used for cleaning the work thoroughly when it emerges from the chromium bath. Good cleaning requires a temperature of at least 180 degrees Fahr. in the tank and quicker results are obtained nearer the boiling point. The tanks are constructed of steel plates, amply insulated and steel encased, and covered when not in use. Only to bring the solution up to temperature in the morning and once or twice during the day is the main burner required; the pilot burner being sufficient to maintain the necessary heat during the intervening hours of the day.

S S S

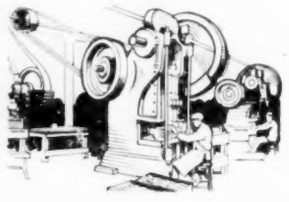
When metal applied by spray gun is to be machined, an allowance of 0.010 to 0.025 inch is made. Sprayed metal is somewhat similar to cast metal and in some respects may be machined similarly. A sprayed bearing may be machined to size either by using a small round-nosed tool taking fine cuts and finishing with emery, or by using an emery wheel for the entire operation since but a few cuts are necessary to clean up the surface.

S S S

TO PROTECT steel water tanks against corrosion, the American Railway Building and Bridge association is recommending the use of quick-drying red lead paint composed of 100 pounds of red lead in oil, 1.5 gallons of boiled linseed oil, 3 pints of turpentine and 2 pints of liquid dryer, and to each gallon of the paint so mixed 2 pounds of finely powdered litharge is added immediately before application. It is advised that one week must elapse between the application of the priming and second coats, and 48 hours between the second and third coats. After the third coat has been allowed to dry for 48 hours the tank is ready for filling with water. The paint is also suitable for use in water softening plants, on bridges and other structures.

S S S

A 2500-pound cast-iron power press frame fractured completely through the main bearing shaft, the break extending through half the bore of the bearing and detaching a piece of metal nearly 12 inches long. To replace the casting would cost $500 and involve weeks of delay, therefore, repair by bronze welding was decided upon as the least expensive and quickest method of restoring the press to service. Preparation required about 5 hours and actual welding was accomplished by one man in 3 hours and 5 minutes. A helper handled a heating torch which played continuously ahead of the weld. Used in the welding were



22 pounds of ¼-inch bronze rods, and 240 cubic feet each of oxygen and acetylene. When the weld was completed, the shaft bearing aligned perfectly. Total cost of the job was approximately $50, or 10 per cent of a new casting.

S S S

A manufacturer of automobile transmissions has found that it can produce a denser forging in all its gear steels by using coarse-grained steel, accurate temperature control and correctly designed dies. Such dense forgings anneal more uniformly and may be machined at greater feeds and speeds, even while reducing the tool costs nearly half. These machined gears respond uniformly to hardening, the change in volume being predictable. Dynamometer tests indicate an increased life of 50 per cent, marked decrease in pitting and granulations, and a stronger, smoother and quieter gear.

S S S

Tests on an alloy iron camshaft run for 500 consecutive hours in a 100-horsepower automobile engine at full throttle showed only perceptible wear at the gear operating the oil pump shaft. Composition of the shaft was: Total carbon, 3.15; manganese, 0.48; silicon, 2.34; molybdenum, 2.25; nickel, 1.70; and chromium, 0.08 per cent.

S S S

EXPERIMENTS to ascertain what precision could be obtained in flame cutting steel plates and beams have been conducted with a straightline cutting machine. In a plate specimen 1¼ inches thick and 15 inches long, the variation in the cut surface was 0.008 inch in lengthwise direction and 0.002 inch in the crosswise direction. A cut specimen which would be exactly 3.50 inches wide was requested and the specimen produced was 3.495 inches wide. In other experiments it was found that the edge would remain straight and smooth when as little as 1/16 inch was removed by the flame. These experiments seem to justify the conclusion that precision flame cutting may be expected in the near future.

S S S

Small additions of molybdenum in 0.40 to 0.50 per cent carbon steel are recommended to prevent creep at high temperatures. Castings of this character are used in valves for superheated steam lines, refinery and chemical plant service and in tongs, hooks and small parts for handling hot materials.

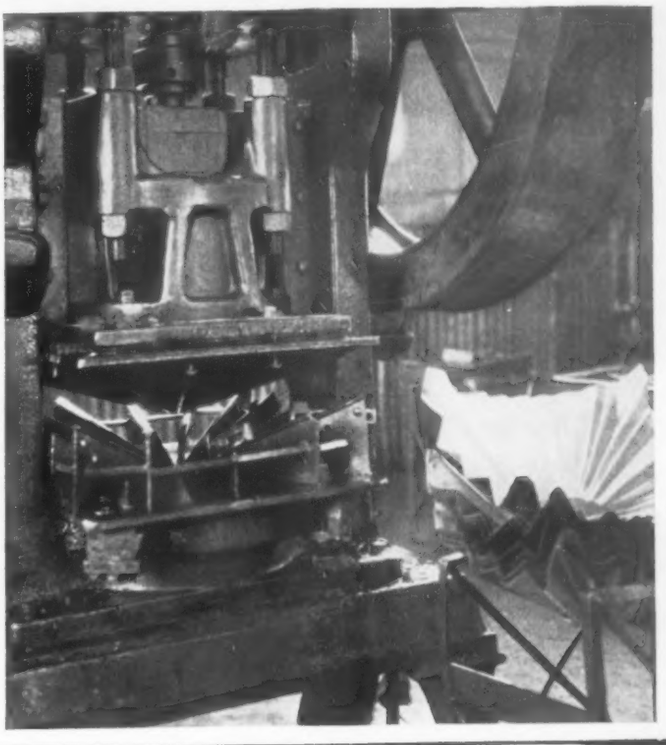
S S S

Machine construction frequently calls for the riveting of a part to a die casting. In a number of cases riveting studs can be cast directly into the piece at practically no extra cost and a final saving effected. Besides this, a head might not harmonize with the design of a finished surface and by die casting the rivet in one piece with the casting the head does not show.

Pressing

Wherever a pressing operation is required in the fabrication of sheet steel products, Youngstown Sheets again point the way to manufacturing economies.

Pictured at the right is a pressing operation in the manufacture of one of the thousands of products in which Youngstown Sheets are consistently demonstrating their outstanding merits.



YOUNGSTOWN SHEETS

Sheets are confusingly alike - - until you start working them! That is why Youngstown Sheets make such numerous and lasting friends.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

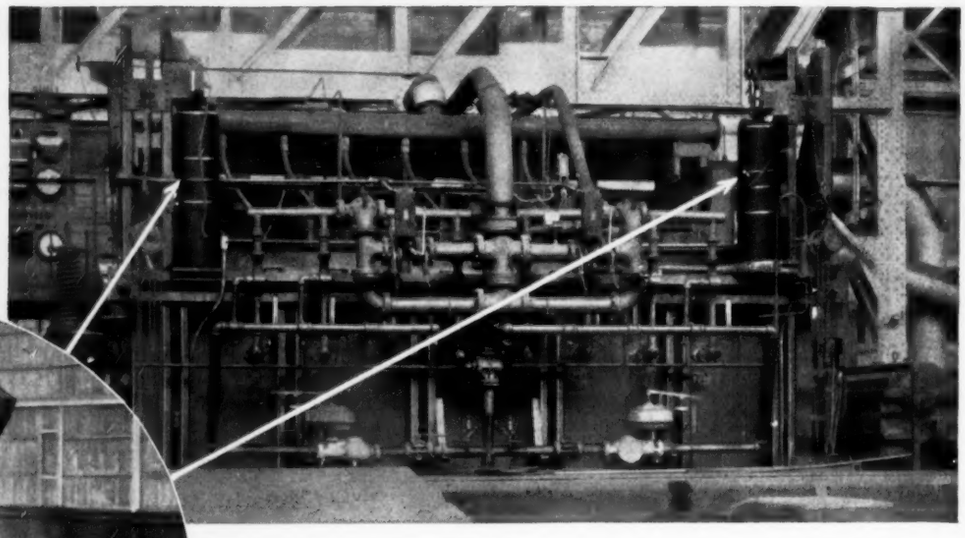
General Offices: YOUNGSTOWN, OHIO

One of the oldest manufacturers of copper-steel, under the well-known and established trade name "Copperoid"

YOUNGSTOWN

SHEETS FOR EVERY PURPOSE .. INCLUDING YOURS

A Two-ton Thrust for a Steel Mill Job



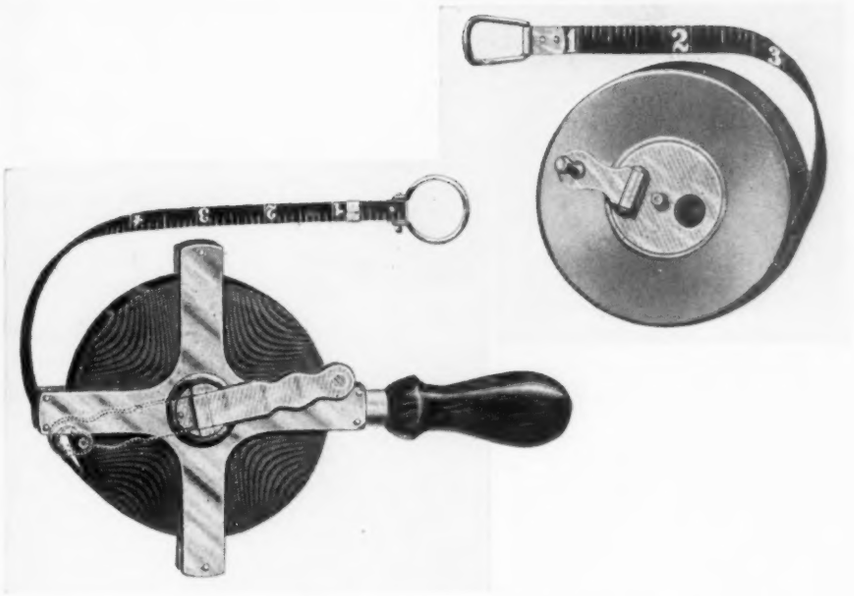
HERE are two 4000-pound Thrustors operating the door in a large billet-reheating furnace. Their action is velvet smooth — no grabbing, no jerking, no vibration — a cushioned stroke in each direction. A simple throw of the control switch, and the operation is complete. Thrustors are easy and inexpensive to install, simple to operate, convenient, and safe.

THRUSTORIZE TO ECONOMIZE

There are dozens of places around the steel mill where Thrustors will simplify operations and save time and money. For example, apply them on dampers and air valves for open-hearth furnaces, on shear stops for merchant mills, on pushers for heating furnaces. In fact, wherever you require a powerful straight-line thrust, always under control and always ready to go, install a G-E Thrustor. Write for a copy of our new Thrustor Bulletin, GEA-1262B. Address your nearest G-E office, or Industrial Department, General Electric Company, Schenectady, N. Y.

301-112

GENERAL ELECTRIC



High-carbon, cold-rolled strip steel is used extensively in making measuring tape, 100 feet of ⅜-inch tape weighing about one pound. Cases also are made of steel

Large Uses of Steel In Small Ways

232nd Article ◆ Measuring Tape

STEEL plays an important part in steps preliminary to and in connection with various types of construction work. One of these is in the form of measuring tape. Measuring tape often is subjected to hard usage, particularly in outdoor construction, and must have suitable tensile strength and wearing qualities. It must be impervious to large variations in length due to temperature changes, must resist distortion and be easily coiled when not in use. Steel meets these specifications.

Steel measuring tape commonly is made in lengths of 25 to 100 feet when enclosed in a case. When carried on a reel the length may be as high as 300 feet. Flat steel wire tape for city, bridge, mine and railroad engineering work is made from 100 feet up to 500 feet in length and can be furnished up to 1000 feet. Tapes also are made with graduations in metric system, and special types, such as those graduated to give the diameter equivalent of a circumference being measured, also are procurable. Steel tapes vary in width usually from ⅛-inch to ⅜-inch, with such intermediate width as 3/16, ¼ and 5/16-inch. Thickness ranges from 0.004 to 0.018-inch.

Measuring tape ordinarily is made of high-carbon cold-rolled strip steel rolled to the desired width. Chrome-nickel steel so far has been used but little in the manufacture of the ribbon, although this is seen as a future possibility. Marking of the tape is accomplished by etching either the numbers of the background. Preparatory to etching the steel is coated with a suitable compound, and the figures are stamped, with the tape under a tension of 10 pounds up to 100 feet and 20 pounds if longer. The tape then is immersed in an acid which etches the various divisions. A special black finish may be applied to tape having etched divisions, in order to increase the legibility of the numbers and also to prevent rusting.

Stamped Steel Cases

Cases for coiling the tape usually have a lining stamped from steel 0.018 to 0.032-inch thick with a hand-sewed leather cover. A loop riveted to the ribbon, used for fastening one end of the tape at a point from which a measurement is being taken as well as the crank for winding up the tape also are made of steel. The former may have steel anchoring spurs attached to it to be used in fastening the end of the tape to boards, sheet metal, pipes, etc. Some cases have a nickel plated finish instead of the leather cover.

On steel chain tapes used for measuring long distances, divisions and numbers are stamped on nickel silver, brass or babbitt metal bands clamped and soldered to the tape. Ends of the bands are beveled to prevent their catching on underbrush or on each other when winding or unwinding the ribbon. Reels for coiling the tape usually are made of nickel plated steel, some of the larger ones being aluminum.

Several thousands of pounds of steel are consumed annually in the production of steel measuring tape, although production varies considerably with the trend in building activity. One hundred feet of ⅜-inch tape weighs about 1 pound.

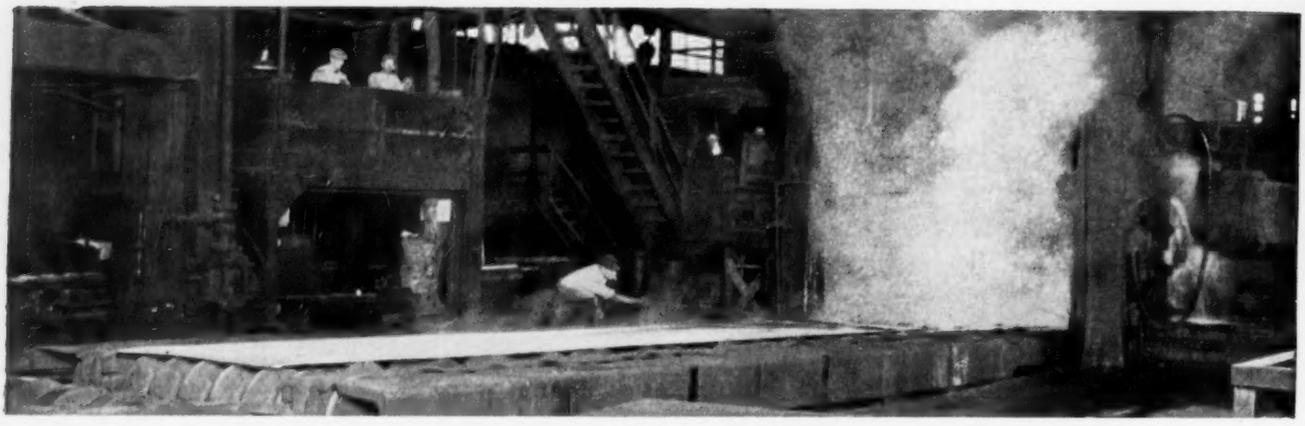
Alloy Used as Filler in Bending Metal Tubes

A new alloy called "Bendalloy" has been placed on the market by the Cerro de Pasco Copper Corp., 44 Wall street, New York. It is composed of bismuth, lead, tin and cadmium and fuses at 160 degrees Fahr. It is used in the bending of tubes. The molten alloy is poured into the tubes to be bent, and chilled in order to form a fine grain structure. The bending must be done slowly with a uniformly applied load. The new alloy is adaptable for use in the bending of all types of tubes including copper, duralumin, aluminum, brass, steel, stainless steel, etc., but is not recommended for bending lead pipe. It is not intended for production jobs but only where one to several hundred difficult bends of a particular type are desired.

The advantage of the new metal, as compared with various tube fillers customarily employed, such as resin, sand and pitch, is claimed to be in the fact that the alloy may be completely melted out of the tube after bending, simply by immersing in boiling water. This already has led to the use of the alloy in the aviation industry where no chance can be taken of leaving grains of sand, particles of resin or pitch in the tubes which comprise the oil, gas and water lines.

Tentative Standards Issued For Criticism and Comment

American Society for Testing Materials, 1315 Spruce street, Philadelphia, has published tentative standards for review and criticism, dealing with zinc coated iron or steel wire of various grades, structural medium and rivet steel, ferrotungsten, lap welded and seamless steel and lap welded iron boiler tubes, electric fusion welded steel pipe, riveted steel and wrought iron pipe, low-carbon ferromolybdenum, and methods of chemical analysis of ferrotungsten and ferromolybdenum.



PROGRESS IN STEELMAKING

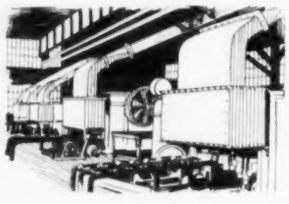
RADIANT power of a luminous flame at normal open-hearth working temperature is about four to six times that of a nonluminous flame at the same temperature. An open-hearth furnaces redesigned for luminous flame operation showed a faster melting time, safer brick temperatures and a 50 per cent reduction in the fuel required.

♦ ♦ ♦

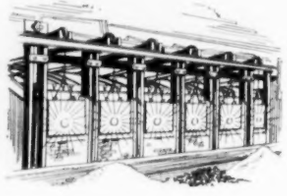
Checking the temperature of steel going through the rolls at a mill in the Pittsburgh district is accomplished by an instrument actuated by photronic cells.

♦ ♦ ♦

Ordinary forged steel rolls of 0.70 to 0.80 per cent carbon which have been ground to a high finish and then plated with chromium now are finding application in roller leveling machines. Because of the hardness of the alloy coating, the rolls afford maximum service and often outlast tool steel rolls from four to six regrindings. When the coating indicates wear it is stripped off and replated without regrinding provided the steel surface of the roll has not been marred. The cost of plating the roll with chromium is said to be inexpensive considering the initial cost of the roll.



A STEEL company that was contemplating the use of natural gas to replace coal for heating pairs and sheets recently equipped one mill with natural gas using the controlled luminous flame type of combustion. The sheet furnaces were of the old hand-mill type and the pair furnace of the 3-door in-and-out type. The furnace temperature was held more uniform because of the constant supply of fuel, the pairs and packs were softer and a reduction in scale was effected. An average of 2200 feet of 1000 B.t.u. gas was required per finished ton for the entire operation of three heatings. The net yield of the mill was increased 3 per cent and the capacity 22 per cent. During the test mostly tight iron of 22, 24 and 26 gage was rolled.



NATURAL gas at 150 pounds pressure for atomizing fuel oil has been substituted for steam atomization at an open hearth making alloy steel, resulting in improved fuel consumption and a reduction in the time of heats. The theory is that natural gas under pressure is released at the burner nozzle; the oil is more finely divided; and that more surface is exposed to the air coming from the checker chamber. The changeover has effected an increase in the rate of combustion, higher temperatures, a sharper flame and a decrease in the time required to melt down the scrap and pig in the charge. When installed on another open hearth scheduled on plain carbon steel and using by-product coal tar as fuel, however, the foregoing advantages were not duplicated.

♦ ♦ ♦

High-physical properties at elevated temperatures are claimed for a chrome-tungsten steel recently developed by an Eastern alloy steelmaker. The material, which has a creep test value of 11,500 pounds at 1000 degrees Fahr., is finding wide usage in the form of bolts and studs for boiler work and other application where high temperatures are encountered.

♦ ♦ ♦

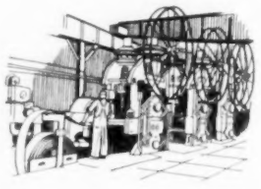
Insulating brick, which satisfy both structural and insulating requirements, now are available. This two-purpose material suitable for electric furnace linings and other linings laid up with an inner plastic refractory, has effected a saving in fuel costs and an increase in furnace capacity.

♦ ♦ ♦

Another squeal is about to be extracted from pig metal, inasmuch as a new design of pig machine shortly will be installed at a blast furnace, promising about 25 per cent lower first cost, about 50 per cent lower operating cost and approximately 50 per cent less maintenance cost.

♦ ♦ ♦

Steel containing 0.50 to 0.80 per cent copper, 0.40 per cent chromium, 0.15 per cent carbon, 0.25 per cent silicon and 0.80 per cent manganese is highly recommended for structural shapes. It possesses all the valuable properties of 1 per cent silicon steel, is easily welded and is more resistant to corrosion than copper bearing carbon steel.



MAINTAINING constant tension on strip steel between the cold mill and coiler is effected electrically by a newly devised automatic regulator. An even pull is provided by a method of balancing the currents in the regulator and is obtained by a twist of a rheostat knob, thus preventing wrinkled stock.

. . . YET IT COSTS LESS!

REPUBLIC salesmen everyday hear prospective buyers of Toncan Iron Pipe say, "But it costs more." But that's no argument against buying it—at least hundreds of actual users don't think it is, because in the end it actually costs less.

Bare pipe prices are no basis for figuring values. The true yardstick is the cost of the pipe installed divided by the service life. Installation usually costs more than the pipe and fittings, and when failure occurs the entire installation cost is lost forever. Then it costs money to tear out the old, and the original cost must be paid again for the replacement. Figure it this way. One kind of pipe lasts, say 5 years. Another 10 years. Even if the 10 year pipe costs twice as much as the other, it saves money for the user—saves the entire cost of tearing out the old and replacing with the second installation.

Toncan Iron Pipe lasts longer because it is made from an alloy of scientifically refined iron, copper and molybdenum. It costs more to make, yet it costs less to use because its resistance to corrosion among ferrous metals is exceeded only by the stainless irons and steels. Wherever the spectre of rust raises its ugly head, Toncan Iron Pipe will save you money.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES YOUNGSTOWN, OHIO

REG. U.S. PAT. OFF.
TONCAN
COPPER
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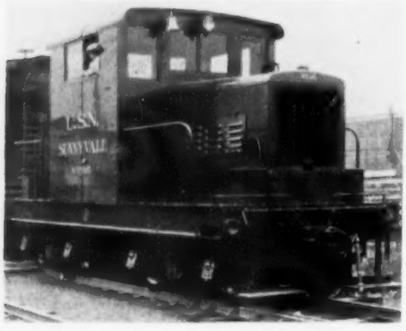
IRON PIPE

NEW EQUIPMENT

PRODUCTION FABRICATION TREATMENT FINISHING

Gas-Electric Locomotive Has Industrial Possibilities

Atlas Car & Mfg. Co., Cleveland, recently completed a 45-ton gas-electric locomotive for the United States navy. The unit, shown herewith, is powered by two 170 horsepower gas engines which drive generators to produce current for the electric propulsion motors. All functions of control are accomplished electrically including separate gas engine acceleration. This unit is essentially a switching locomotive with definite possibilities of application to industrial haulage requirements.



Gas-electric locomotive built recently by Atlas Car & Mfg. Co.

◆

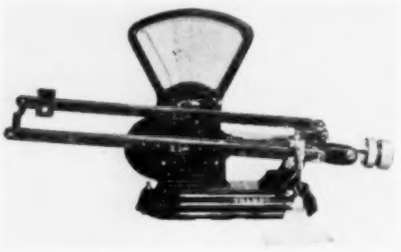
Belting Resists Effects of Chemicals and Oils

B. F. Goodrich Co., Akron, O., recently announced rubber belting which resists chemicals and oils, and claimed to be the first product of its kind perfected. A patent covering the new type belting was issued by the patent office early in November. The new product has given satisfactory service after complete immersion in oil for several days, while ordinary belting will last only one third as long when subjected to similar exposure, according to Goodrich engineers.

◆

Unit Measures Changes in Physical Properties

Toledo Precision Devices Inc., Toledo, O., recently developed a variation autogage which has many applications in various fields in measuring and indicating the increase or loss of any physical property in materials. Increases or decreases in elasticity, specific gravity or moisture are shown quickly, it is claimed. The unit, shown herewith, will determine the percentage of volatiles which can be driven out of a material, and is expected to be highly helpful in measuring the elasticity of rubber. Two sizes are available.

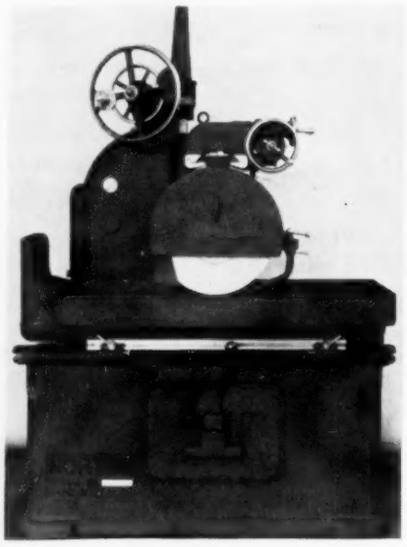


Autogage developed by Toledo Precision Devices Inc. measures physical properties of materials

◆

Surface Grinding Machine Is Operated Hydraulically

Norton Co., Worcester, Mass., has developed a hydraulic grinding machine by which heavier and forging dies may be surfaced without removal of guide posts. Grinding of such dies with permanent posts has been a difficult operation in many instances. The new Norton 10 by 12-inch surface grinder was designed to handle this class of work. The machine is hydraulically operated and can be furnished with an automatic cross feed which is also hydraulically operated, if this latter feature is desired. One advantage of this unit is that heavier dies can be ground more often, keeping them in better condition because the operation of regrinding is easier and more economical. Unit is shown herewith.

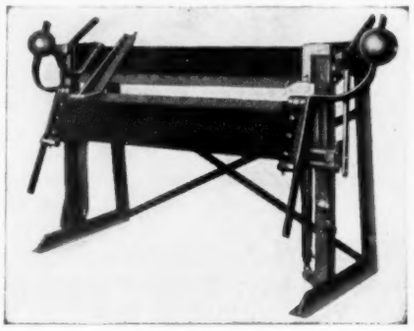


New hydraulic surface grinding machine manufactured by Norton Co.

◆

New Metal Brake Is Dual Machine

Whitney Metal Tool Co., 110-14 Forbes street, Rockford, Ill., is manufacturing the metal brake shown in the accompanying illustration. A feature is the fact that this unit is a dual machine—in a minimum of time it can be converted into a box or pan brake as well as a bending brake. The member or platen which holds the work, or in other words the part against which the material is held for the bending process, is stationary. This accounts for the accurate operation of the unit and the production of square corners.



Metal brake announced recently by Whitney Metal Tool Co.

Fastening various fingers to the platen will facilitate the production of any desired pan or box within the limits of the machine. The stationary platen can be moved backward by means of screws so the box fingers will be in proper alignment with the bending apron. On either end of the machine are connecting links which are employed to oscillate the up and down movement of the lower bending rail.

AMERICAN STEEL SHEETS

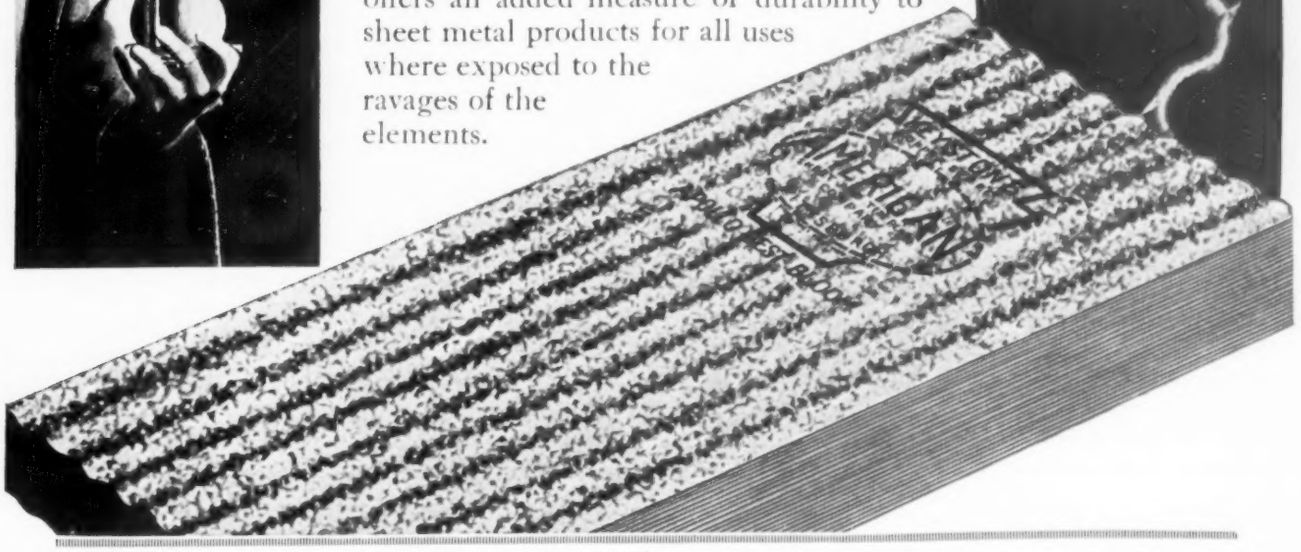
AMERICAN SHEET AND TIN PLATE COMPANY PITTSBURGH

MEETING time and weather requires sheet metal products that are *right* in every detail, and have back of them the recognized ability to render lasting service.

KEYSTONE

Rust Resisting Copper Steel

offers an added measure of durability to sheet metal products for all uses where exposed to the ravages of the elements.



AMERICAN Products are supplied in Black and Galvanized Sheets, Automobile Sheets, Electrical Sheets, Enameling Sheets, Keystone Rust Resisting Copper Steel Sheets, Heavy-Coated Galvanized Sheets, Galvannealed Sheets, Formed Roofing and Siding Products, Special Sheets, Tin and Terne Plates for all known purposes; also U S S Stainless and Heat Resisting Steel Sheets and Light Plates.

U S STEEL

American Sheet and Tin Plate Company

GENERAL OFFICES: Frick Building, PITTSBURGH, PA.

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

KEYSTONE AMERICAN

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AMERICAN SHEET AND TIN PLATE COMPANY
AMERICAN STEEL & WIRE COMPANY
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NATIONAL TUBE COMPANY
FEDERAL SHIPBUILDING AND DRY DOCK COMPANY

OIL WELL SUPPLY COMPANY
THE LORAIN STEEL COMPANY
TENNESSEE COAL, IRON & R.R. COMPANY
UNIVERSAL ATLAS CEMENT COMPANY

Pacific Coast Distributors—Columbia Steel Company, San Francisco, Calif.
Export Distributors—United States Steel Products Company, New York, N. Y.

"The blanks are okay but turn them other side up on the die"...

ADVISED SHARON SPECIFICATIONS

THUS . . . . . BREAKAGE WAS ELIMINATED

The fabricator was "stumped" — A burr on the sheared edge of the steel strip was causing trouble — splits and breaks. Something wrong with the steel, he thought, naturally. But "Sharon Specifications" discovered a different, more logical cause. ▼ Nothing wrong with the steel. "Sharon Specifications" had originally developed it *definitely* for this important automobile part. A simple remedy was proposed — turn the blanks over, with the burr to the inside. There was no more breakage trouble. ▼ Often the careful scrutiny of Sharon's engineers finds in the manufacturer's own plant the real solution to puzzling, costly problems. Just one of the benefits to be derived from taking advantage of "Sharon Specifications" — a thorough engineering service inseparably associated with Sharon's high grade strip and sheet steel. Send us the details, and experience the benefits of "Sharon Specifications" on your product problem.

SHARON STEEL HOOP CO.—SHARON, PA.

Strip Steels
Hot and Cold Rolled
—
"Nevastain"
Stainless Steels
—
"*Enamelite*"
Enameling Iron
—
Steel Sheets

Shape Buying, Ford Needs, Temper Decline

Building Steel Awards Second Best of Year—Ford Places Small Lot for 1933 Models—Steel Rate Off to 15—Markets Descending Into Holidays

STRUCTURAL steel buying that has been exceeded in only one week this year, first releases by Ford for new models, and resumption of a rail mill in the Pittsburgh district somewhat relieve a further decline in steel production to 15 per cent.

Including federal projects at Philadelphia, Norfolk, Va., and Cleveland, the week's structural awards reached 34,597 tons. Pending work, also chiefly of a public nature, is heavier.

A Detroit mill is the beneficiary of the first Ford commitment for steel for the new line, and there are indications that Ford shortly will be more heavily in the market. Some parts business has been distributed, and in late December and early January increased activity at Fordson may temper a seasonal decline by other manufacturers, excepting Chevrolet. Chrysler is inquiring for first quarter steel.

About Dec. 15 the Edgar Thomson rail mill of the Carnegie Steel Co. will be reopened, which is encouraging because it was expected that a 10-day run in November would be the last this year. In the West, the Santa Fe authorization of 26,484 tons is the largest prospective rail business since the price was reduced $3. Canadian National Railways has ordered 500 freight cars.

While producers are reconciled to a descent into the year-end valley, the falling away from the November peak of the fall rise has proved more rapid than many expected. Since mid-November, operations have gone from 21 per cent to 15. In the same period of 1931, the decline was from 31 per cent to 25½. Official statistics for November place the daily ingot rate at 41,098 tons or 18.05 per cent, indicating that the fall rise came to a peak early in the month. Excepting October, November was the best month in the last six.

The low of 1932 in steel operations, and for that matter of the entire depression, was 12 per cent in the July 4 week. It is now evident that the industry will sink practically that low over the Christmas and New Year holidays. Some fears are expressed that the usual January rise may be handicapped by the absence of rail tonnage, which may be withheld until the railroad wage matter is adjusted.

With books officially opened for first quarter on plates, shapes and bars unchanged at 1.60c, Pittsburgh, steel prices have generally been extended. Weakness in plates in the East and in structural shapes in all districts has not affected official levels. Semifinished quotations have been renewed. A new list, effective Dec. 1, on small carriage and machine bolts is a reduction of 12 to 15 per cent. Shading of reinforcing bars at Pittsburgh is being reflected in quotations.

Excepting structural awards, steel orders the past week have been in small lots. An eastern Pennsylvania mill has booked 1150 tons of plates for a pipeline for Washington. Preliminary survey is being made on a 150-mile water line from Lake Superior to Minneapolis. A West Virginia interest requires 2500 tons of plates for the construction of 12 barges for stock.

Pig iron and other raw materials display the same listlessness as finished products, for one reason because consumers are reducing inventories for tax and accounting purposes In New England, Dutch iron continues to vex. Foundry iron is 25 cents easier in eastern Pennsylvania.

Iron and steel scrap prices are off in all districts, with current levels attractive to consumers but rigid policies against further expenditures this year a barrier to trading. Reflecting further declines, the steelworks scrap composite of STEEL is down 21 cents, to $6.50.

Other composites of STEEL are unchanged, iron and steel at $28.91 and finished steel at $46.70.

Composite Market Averages

	Dec. 10	Dec. 3	One Month Ago Nov., 1932	Three Months Ago Sept., 1932	One Year Ago Dec., 1931	Ten Years Ago Dec., 1922
Iron and Steel Composite	$28.91	$28.91	$29.12	$29.32	$30.32	$40.53
Finished Steel Composite	46.70	46.70	47.20	47.50	47.74	58.39
Steelworks Scrap Composite	6.50	6.71	6.87	7.04	8.16	17.28

Iron and Steel Composite:—Pig iron, billets, slabs, sheet bars, wire rods, tin plate, nails, sheets, plates, shapes, bars, and black pipe. Finished Steel Composite:—Plate, shapes, bars, hot strip, nails, tin plate, pipe. Steel Works Scrap Composite:—Melting steel, compressed sheets.

COMPARATIVE PRICES OF IRON, STEEL AND COKE

Representative Market Figures for Current Week, Last Month, Three Months and One Year Ago

	Dec. 10, 1932	Nov. 1932	Sept. 1932	Dec. 1931
Pig Iron				
Bessemer, del., Pittsburgh	$15.76	15.76	15.76	17.51
Basic, valley	14.00	14.00	14.00	15.00
Basic, eastern, del. eastern Pa.	13.50	13.50	13.75	16.00
No. 2 foundry, del. Pittsburgh	15.76	15.76	15.76	17.51
No. 2 foundry, Chicago	15.50	15.50	15.50	16.60
*Southern No. 2, Birmingham	11.00	11.00	11.00	12.00
**No. 2X, Virginia furnace	17.75	17.75	17.75	18.00
**No. 2X, Eastern, del., Phila.	13.76	13.95	14.26	16.01
Malleable, valley	14.50	14.50	14.50	16.10
Malleable, Chicago	15.50	15.50	15.50	16.60
Lake Superior charcoal, del. Chi.	23.04	23.04	23.04	19.90
Gray forge, del. Pittsburgh	15.63	15.63	15.63	16.88
Ferromanganese, del. Pittsburgh	73.24	73.24	73.24	84.79

*1.75-2.25 silicon. For local delivery. Northern shipments based on $10, Birmingham. **2.25-2.75 silicon.

Delivered pig iron prices subject to 10 per cent freight surcharge, maximum 13.44c per gross ton, beginning Jan. 4, 1932.

Coke				
Connellsville, furnace, ovens	1.75	1.80	2.00	2.30
Connellsville foundry, ovens	2.50	2.65	2.75	3.25
Semifinished Material				
Sheet bars, open-hearth, Youngs.	26.00	26.00	26.00	28.25
Sheet bars, open-hearth, Pitts.	26.00	26.00	26.00	28.00
Billets, open-hearth, Pittsburgh	26.00	26.00	26.00	29.00
Wire rods, Pittsburgh	37.00	37.00	37.00	35.00

	Dec. 10, 1932	Nov. 1932	Sept. 1932	Dec. 1931
Finished Material				
Steel bars, Pittsburgh	1.60	1.60	1.60	1.60
Steel bars, Chicago	1.70	1.70	1.70	1.60
Steel bars, Philadelphia	1.91	1.91	1.91	1.89
Iron bars, Chicago	1.65	1.65	1.65	1.60
Shapes, Pittsburgh	1.60	1.60	1.60	1.50
Shapes, Philadelphia	1.75	1.75	1.75	1.695
Shapes, Chicago	1.70	1.70	1.70	1.60
Tank plates, Pittsburgh	1.60	1.60	1.60	1.50
Tank plates, Philadelphia	1.74½	1.77	1.79½	1.735
Tank plates, Chicago	1.70	1.70	1.70	1.60
Sheets, No. 10 blue anneal., Pitts.	1.70	1.70	1.70	1.85
Sheets, No. 24, hot ann., Pitts.	2.10	2.10	2.10	2.40
Sheets, No. 24 galvan., Pitts.	2.85	2.85	2.75	2.90
Sheets, No. 10 blue anneal., Chi.	1.85	1.85	1.85	2.00
Sheets, No. 24 hot ann., Chi.	2.25	2.25	2.25	2.55
Sheets, No. 24 galvan., Chi.	2.90	2.90	2.90	3.05
Plain wire, Pittsburgh	2.20	2.20	2.20	2.20
Wire nails, Pittsburgh	1.95	1.95	1.95	1.95
Tin plate, per base box, Pitts.	4.25	4.50	4.75	4.75
Scrap				
Heavy melting steel, Pitts.	$8.75	9.15	9.50	10.25
Heavy melting steel, eastern Pa.	6.50	7.25	7.25	7.60
Heavy melting steel, Chicago	5.50	5.60	5.75	7.50
No. 1 wrought, eastern Pa.	6.50	7.25	7.25	9.50
No. 1 wrought, Chicago	5.00	5.00	5.00	7.45
Rails for rolling, Chicago	8.25	8.25	7.00	10.00

Sheets

Light Contracting for First Quarter—New Automotive Releases Awaited—Output Drops

SHEET PRICES, PAGE 43

Pittsburgh—Galvanized sheets are quoted firmly at 2.85c, with black sheets 2.10c. A small volume of contracting is noted for these grades, but insufficient to test prices. Specifications are light, the past two weeks having touched a new low point for many months. Cold rolled sheet prices are based on 2.00c for heavy gage, and 50 cents up for light gage. Blue annealed and heavy hot rolled grades are quiet.

Boston—Large consumers are taking little tonnage with the approach of inventory. Jobbers also are buying sparingly, and report their sales small.

New York—More sellers are adopting a new policy eliminating inspection extras on autobody and furniture sheets, with such materials sold on a cold-rolled basis. The materials will be sold "run-of-mill," with the consumer to accept such second-grade material as may develop in the rolling. It is expected this action will have a stabilizing effect on prices. Sharon Steel Hoop Co., low bidder, is reported to have booked the 1400 tons of sheets for New York automobile license tags. General sheet demand is quiet.

Philadelphia—A local autobody maker is placing a fair tonnage of cold finished material. Leading sellers now are quoting autobody and furniture sheets on a cold rolled basis, with others expected to follow by the first of the year.

Cleveland—Orders for automotive sheets continue to be received by mills here, though in lesser volume than recently, and the operating rate for mills here and nearby working mainly on automotive account has eased down to 25 to 30 per cent. Some have completed automotive rollings, and now are waiting for orders for January delivery. The general market is much quieter, little coming from refrigerator, stove or building sources. A few carloads of black sheets have been sold recently to barrelmakers. One mill interest is still doing 2.10c on black sheets, and has not announced a price schedule for first quarter; though 2.20c is the more general figure.

Cincinnati—Delay in revival of automotive demand and a seasonal drop in specifications from other sources have reduced sheet mill operations in this district.

Chicago—Sheet specifications and operations are declining slowly, with production around 10 to 15 per cent. Producers are quoting unchanged prices for first quarter, except on hot rolled annealed sheets, the market for which is advanced $2 a ton to 2.30c, base.

St. Louis—Sheet orders for December are likely to be the lowest of any month this year. Though prices have been announced for first quarter, little inquiry and practically no sales are noted.

Birmingham, Ala.—Reports are current that an order for sheets for export may aid operations here, but there is nothing definite regarding it. Consumption in this territory is down.

Rod Standard Is Effective

The revised simplified practice recommendation on steel spiral rods for concrete reinforcement has been accepted by a sufficient proportion of the industry to make it effective for one year from Dec. 15. The revised edition shows the application of the four diameters of rods with corresponding cross-sectional areas to all normal column core diameters with ¼-inch intervals of vertical spacing between successive turns.

CURRENT FINISHED STEEL PRICES

Delivered prices subject to freight surcharge corrected to nearest ½c. Asterisk denotes price change this week

Steel Sheets

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.55c
Gary, Ind. Harbor, base	1.65c
Chicago, delivered	1.70c
New York, delivered	1.90c
Birmingham, base	1.70c
Philadelphia, delivered	1.86c

BLUE ANNEALED NO. 9-10

Pittsburgh, base	1.70c
Chicago, district mills	1.80c
Chicago, delivered	1.85c
Philadelphia, delivered	2.01c
New York, delivered	2.05c
St. Louis, delivered	2.04c
Birmingham, base	1.85c
San Francisco c.i.f.	2.32½c

HOT ROLLED ANNEALED NO. 24

Pittsburgh, base	2.10c to 2.20c
Gary, Ind. Harbor, base	2.20c to 2.30c
Chicago, delivered	2.25c to 2.35c
New York, delivered	2.45c to 2.55c
Philadelphia, del.	2.41c to 2.51c
Birmingham, base	2.35c
St. Louis, delivered	2.54c
San Francisco, c.i.f.	2.85c
Detroit, delivered	2.28½c

GALVANIZED NO. 24

Pittsburgh, base	2.85c
Gary, Ind. Harbor, base	2.95c
Chicago, delivered	3.00c
Philadelphia, delivered	3.16c
New York, delivered	3.20c
Birmingham, base	3.00c
St. Louis, delivered	3.19c
San Francisco, c.i.f.	3.50c

AUTOBODY NO. 20

Pittsburgh, base	2.55c to 2.65c

FURNITURE

Pittsburgh, No. 10 heavy	2.40c to 2.50c
Pittsburgh, No. 20 light	2.90c to 3.00c

TIN MILL BLACK NO. 28

Pittsburgh, base	2.30c
Gary, base	2.40c
St. Louis, delivered	2.67½c

HEAVY COLD ROLLED NO. 10

Pittsburgh, base	2.00c
Gary, Ind. Harbor, base	2.10c
Chicago, delivered	2.15c
Philadelphia, delivered	2.31c
New York, delivered	2.35c

COLD ROLLED NO. 20

Pittsburgh, base	2.50c
Gary, Ind. Harbor, base	2.60c
Chicago, delivered	2.65c
Philadelphia, delivered	2.81c
New York, delivered	2.85c

Wire Products

(Prices apply on straight carloads. Mixed and joint carloads take 10 cents higher price; pool carloads 25-cent advance; less carloads 40-cent advance.)

F.o.b. mills, 100 lb. keg

Standard wire nails	$1.95
Cement coated nails	1.95
Galvanized nails	3.95

(Per pound)

Polished staples	2.65c
Galvanized staples	2.90c
Barbed wire, gal.	2.60c
Annealed fence wire	2.35c
Galvanized wire	2.80c
Woven wire fencing (9-11 gage)	$55.00
(12½ gage and lighter)	$60.00

(To Manufacturing Trade)

Plain wire, 6-9 gage	2.20c
Spring wire	3.20c

Chicago and Anderson, Ind., $1 over Pitts.-Cleve.; Duluth and Worcester, $2 higher; Fairfield, Ala., $3 higher.

Steel Plates

Pittsburgh, base	1.60c
Philadelphia, del.	1.69½c to 1.79½c
New York, delivered	1.80c to 1.90c
Boston, delivered	1.92c to 2.02c
Buffalo, delivered	1.85½c
Chicago, base	1.70c
Cleveland, delivered	1.78½c
Birmingham, Ala. base	1.75c
Coatesville, Pa., base	1.60c to 1.70c
Pacific Coast, c.i.f.	2.00c
St. Louis, delivered	1.94c

Structural Shapes

Pittsburgh, base	1.50c to 1.60c
Philadelphia, delivered	1.75c
New York, delivered	1.87c
Boston, delivered	2.00½c
Chicago, base	1.70c
Cleveland, delivered	1.78½c
Lackawanna, N. Y., base	1.70c
Birmingham, Ala., base	1.75c
Pacific Coast, c.i.f.	2.10c
Do., wide flange	2.20c

Bars

SOFT STEEL

Pittsburgh, base	1.60c
Chicago, base	1.70c
Birmingham, Ala., base	1.75c
Lackawanna, N. Y., base	1.70c
Pacific Coast, c.i.f.	2.00c
Cleveland, base	1.65c
Philadelphia, delivered	1.91c
New York, delivered	1.95c
Boston, delivered	2.02c
Pittsburgh, cold finish	1.75c
Pittsburgh, forg. qual.	1.85c
San Francisco, c.i.f.	2.10c

RAIL STEEL

Chicago Heights	1.50c
Eastern mills	1.35c

IRON

Chicago, base	1.60c to 1.65c
New York, delivered	1.85c to 1.90c
Philadelphia, delivered	1.81c to 1.86c
Pittsburgh, refined	2.70c to 4.20c

REINFORCING

*Pitts., billet cut lengths	1.65c to 1.75c
*Pitts., stock lengths, mill	1.50c to 1.60c
Chicago, billet	1.50c to 1.60c
Chicago, rail steel	1.20c to 1.30c
Philadelphia, cut lengths	1.86c
Cleveland, cut lengths	1.75c

Cold-Finished Bars, Shafting

Base, Pittsburgh

10,000 to 19,999 pounds	1.70c
20,000 to 59,999 pounds	1.65c
60,000 to 99,999 pounds	1.60c
100,000 pounds and over	1.57½c

Chicago, Cleveland, Buffalo 5c higher; Detroit, 20c; eastern Michigan 25c

Corrosion, Heat Resist. Alloys

Base, Pittsburgh

18 per cent chrome, 8 per cent nickel Sheets, 35c; plates, 31c; bars, 28c.

	A	B	C	D
Bars	19c	20.5c	23c	28c
Plates	21c	22.5c	25c	30c
Sheets	26c	27.5c	30c	35c
Hot Strip	19c	20.5c	23c	28c
Cold Strip	25c	26.5c	29c	34c

Carbon 0.12 and under; no nickel. A has chrome 15% and under. B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Tin and Terne Plate

Per 100-pound box, Pittsburgh

Tin plate, coke base, cont.	$4.25
Tin plate, coke base, stock	3.75
Long ternes, 24, unassorted	2.80

Gary, Ind., base 10 cents higher

Alloy Steel

Hot Rolled—F.o.b. Pittsburgh, Buffalo, Chicago and Massillon, O.

Hot rolled; base 2.45c to 2.65c, mills; differentials to various consumers

S.A.E.	Alloy Diff.	4600 .20 to .30 Mo. 1.25-1.75 Ni.	1.05
2000	0.25	5100 80 - 1 10	
2100	0.55	Cr.	0.45
2300	1.50	5100 Cr.	
2500	2.25	spring	0.20
3100	0.55	6100 bars	1.20
3200	1.35	6100 Spring	0.95
3300	3.30	Cr., Ni., Van.	1.50
3400	3.20	Carbon van	0.95
4100 .15 to .25		9250 (flats)	0.25
Mo	0.50	9250 (rds., sq.)	0.50

Strip, Hoops, Bands

Hot-rolled strip up to 23 15/16 in. wide Pitts.	1.45c
Do., Chicago	1.55c
Do., del. Philadelphia	1.76c to 1.81c
Do., del. New York	1.80c to 1.85c
Cooperage hoop, Pitts.	1.55c to 1.60c
Do., Chicago	1.65c to 1.70c
Cold-roll, strip, Pitts., Cleve.	2.00c
*Worcester, 3 tons or over	2.20c

Rivets, Wrought Washers

Struc., c.l., Pitts-Cleve.	2.25c
Struc., c.l., Chicago	2.35c
7/16-in. and smaller, Pitts., Chicago, Cleveland	70, 10 and 5 off
Washers, c.l., Pitts. dist.	$6.50 to 6.75 off
Do., Chicago district	7.00 to 7.50 off

Rails, Track Material

Standard rails, mill	$40.00
Relay rails, Pitts, 20 to 45 lbs.	$21.00 to 23.00
50 to 75	18.00 to 20.00
80 to 100	23.00 to 25.00
Light rails, 25-45, mills	$30.00
Light rails, Chicago	$32.00
Angle bars, mills	2.55
Spikes, railroad, mills	2.40c
Spikes, boat, barge, Pitts.	2.65c
Track bolts, Chicago	3.50c
do., standard, jobbers	73 off list
Tie plates, Pitts.	$35.00
Tie plates, Chicago	$35.00

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chi. Discounts to legitimate jobbing or large consuming trade for full-case lots apply to May 10, 1930, lists.

CARRIAGE BOLTS

All sizes, cut thread ..... 75 off
Rolled thread ⅜ x 6 and smaller take 10 per cent lower list.
Eagle list ..... 75 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts ..... 75 off
Tire bolts ..... 60 and 10 off
Stove bolts, 77½, 25 and 10 off in pkgs.; 86 off in bulk.
Rolled thread machine bolts, ⅜ x 6 and smaller take 10 per cent lower list.

NUTS

Semifinished ..... 75 off

HEXAGON CAP SCREWS

Milled ..... 80-25 off
Upset 1 in. diam. and smaller 80-25-10 off

SQUARE HEAD SET SCREWS

Upset, 1 in. and smaller ..... 75-10-10 off
Headless set screws ..... 75-10 off
Upset, larger than 1 in. ..... 75-10 off

Cut Nails, Chain, Piling

Cut nails, c.l. Pittsburgh	$2.50
Do., less carloads, 5 kegs or over	$2.90
Less than 5 kegs	$3.05
Steel sheet piling, Pitts.	1.90c

Bars

Prices Reaffirmed for First Quarter—Most Buying Is for Immediate Requirements

BAR PRICES, PAGE 43

Chicago—While specifications for soft steel bars show only slight changes, demand is moderately less active. Improved operations of farm implement manufacturers so far have been insufficient to cause any substantial gain in steel orders, while requirements of the automotive industry are fairly steady. Producers have opened first quarter books with the market continuing 1.70c, Chicago. Rail steel bars hold at 1.50c.

New York—Apart from some small ship tonnage and scattered railroad buying, demand for commercial steel bars continues negligible. Jobbers are specifying lightly, and general manufacturing requirements are small, particularly those of the bolt and nut manufacturers, who normally are the principal consumers here. Steel bars are fairly steady at 1.60c, Pittsburgh, and common iron bars 1.50c to 1.55c, Pittsburgh.

Pittsburgh—Merchant bars have been reaffirmed at 1.60c, Pittsburgh, and alloy bars also at 2.45c to 2.65c, mill, both for first quarter. Both hot and cold-rolled alloy bars are moving well this month, several smaller producers of these items being able to maintain continuous operations on a fair level. This business is largely for automotive accounts. A large automobile manufacturer issued its inquiry for first quarter last week. A few other accounts, mainly small, are inquiring for first quarter. A Washington fabricator is placing 1500 tons of reinforcing bars for the federal archives building with a West Virginia bar mills.

Cleveland—A few orders for commercial steel bars have been booked for delivery in the first quarter at 1.65c, base, Cleveland. Occasional releases for single carloads come from railroads; automotive demand has fallen off and miscellaneous business is lighter. Foreign steel in eastern territory makes it impossible for northern Ohio mills to compete there.

Cold-Finished in Better Demand for Auto Use

Cold Finished Prices, Page 43

Pittsburgh—Base price of 1.70c, Pittsburgh, for 5 to 10-ton lots of cold-finished steel bars has been reaffirmed for first quarter. Automotive releases are in fair amount, much better than at the beginning of the present quarter. The tendency is noted on the part of miscellaneous customers, however, to greatly restrict their orders recently. This is caused by the smaller jobbers especially having bought fairly well in October and presence of inventory at hand in the plants of other miscellaneous buyers.

Contract for Tin Plate; Large Order Goes Abroad

Tin Plate Prices, Page 43

Pittsburgh—Several fair size contracts for 1933 have been booked for tin plate. Operations at better than 40 per cent are up from a week ago and it is indicated the rate will range from 40 to 45 per cent over the remainder of this year. The official price of $4.25 per base box is firm, with tin mill black 2.30c, Pittsburgh, and long ternes 2.80c.

New York—Consumers are contracting more actively, with substantial specifications expected to be released soon. American Can Co. has placed 1,000,000 boxes with Welsh tin plate makers for its Canadian plants, it is reliably understood.

Semifinished Steel Prices Are Reaffirmed

Semifinished Prices, Page 50

Sheet bars, billets and slabs have been reaffirmed at $26, Pittsburgh, Youngstown, O., and Cleveland for first quarter. The prevailing market of $31 for forging billets will also continue. Wire rods were extended a week ago at $37, Pittsburgh. Current prices at Chicago also have been reaffirmed. Tin mills are requiring more semifinished steel, but nonintegrated sheet and strip makers have been heard from less frequently than a month ago.

Plates

Tank Work More Promising—1150 Tons Placed for Washington Water System

PLATE PRICES, PAGE 43

Chicago—A fair volume of inquiry for oil and gasoline storage tanks and elevated water tanks, the latter for self-liquidated projects for which federal aid is being sought, gives a slightly better tone to a dull plate market. Lack of business for freight car and locomotive construction and repair work is felt keenly. Oil companies are expected to continue light buyers until next year, recent purchases being for repairs and minor improvements. A few small tank orders have been received from breweries, with more in prospect. Plates continue 1.70c, Chicago, for first quarter.

Boston—Railroad shops are doing slightly more repair work, but demand for plates generally is slower, and prices are less steady. Shipyards are doing some miscellaneous work.

New York—Local plate demand is comprised of small lots, with oil companies the principal buyers. The largest is 125 tons for a tow boat for B. Turcano Towing Co., Brooklyn, N. Y., on which the Bath Iron Works, Bath, Me., is low bidder. The market on the usual run of carlot business is 1.60c to 1.70c, Coatesville.

Philadelphia—An order for 1150 tons of plates for 48-inch pipe for the District of Columbia water commission, Washington, has been placed with an eastern Pennsylvania mill at a price substantially under the generally accepted market. The pipe will be fabricated at the Dunkirk, N. Y., plant of Alco Products Inc.

Cleveland—About 40 tons of floor plates will be required for the new postoffice here, steel for which is now being purchased. The conveying system will require a considerable amount of light shapes and steel parts. Small, miscellaneous requirements give mills little tonnage. The price holds at 1.60c, base, Pittsburgh.

Pittsburgh—Books have been opened for first quarter at 1.60c, Pittsburgh. Miscellaneous specifications show no improvement, and leading plate mills in this district are operating at 15 per cent. About 600 tons will be required for a steel hull

for a dipper dredge which Dravo Contracting Co. will build for a New York dredging contractor, and 500 tons for a tank top for the steamer WILLIAM B. DICKSON at Conneaut, O., will be specified from a local mill. A barge builder at Pt. Pleasant, W. Va., has decided to make 12 steel barges for stock, these requiring 2500 tons of plates.

Contracts Placed

1150 tons, 48-inch pipe, District of Columbia water commission, Washington, to an eastern Pennsylvania mill; Alco Products Inc. will fabricate the pipe at Dunkirk, N. Y.

700 tons, for car repairs, Reading railroad, distributed to three eastern mills.

600 tons, steel hull for dipper dredge for G. H. Breyman Bros., dredging contractors, New York, to Dravo Contracting Co., Neville Island, Pittsburgh; hull to be 150 x 55 x 12 feet. Fabrication at Neville Island shipyards, to be shipped to Wilmington, Del., plant for erection.

500 tons, tank top for Pittsburgh Steamship Co., ore carrier WILLIAM B. DICKSON at Conneaut, O., to Carnegie Steel Co., Pittsburgh.

156 tons, water tank, northern New Jersey, to Tippett & Wood Inc., Phillipsburg, N. J.

100 tons, one 800 and one 25,000-barrel tank, Associated Oil Co., Avon, Calif., to Western Pipe & Steel Co., San Francisco.

100 tons, butterfly valves and sluice gates for San Gabriel dam No. 2, Los Angeles county, California, to Pelton Water Wheel Co., San Francisco.

Contracts Pending

2500 tons, 12 steel barges for stock to be built privately for Marietta Mfg. Co., Pt. Pleasant, W. Va.

400 tons, penstock and discharge pipe, Wapato, Wash., irrigation project; bids Dec. 8.

125 tons, tow boat for B. Turcano Towing Co., Brooklyn, N. Y.; Bath Iron Works, Bath, Me., low; approximately 75 tons of shapes and bars also will be required.

Refractory Sales Light; Prices Hold into 1933

Refractories Prices, Page 50

Pittsburgh—Refractory inquiries into first quarter of 1933 have been in the market recently. It is understood unchanged prices of $35 per 1000 on first quality fire clay brick will apply into first quarter and markets of $61.50 for magnesite and $42.50 for chrome brick will also hold. Specifications for refractories have been declining and December will record a volume comparable to the former two low months of the year, July and August. Plans of a division of one steel mill to resume the middle of this month have lent some encouragement.

Railroads

Santa Fe Authorizes Placing of 26,484 Tons of Rails—Illinois Central Order Near

TRACK MATERIAL PRICES, PAGE 43

Chicago—Santa Fe railroad is expected to place 26,484 tons of rails shortly, authorization of the purchase of which was made recently, but the outlook for general buying by railroads continues rather drab. An order from the Illinois Central railroad for 6000 tons for first quarter shipment also is anticipated. Releases against old orders continue in their former quiet volume, although rail mill operations are being maintained at a slow rate. Releases of fastenings also involve only small lots, while specifications for miscellaneous steel products lack improvement in keeping with restricted operations at car and locomotive shops. New inquiry for equipment is lacking and action is deferred on pending inquiries.

Executives of 21 international railroad labor organizations are meeting here in session with the managers' conference committee in connection with the proposed extension of the recent 10 per cent wage reduction. Agreement under which the brotherhood members now are working expires Jan. 31, 1933.

New York—Award of 500 all-steel gondolas by the Canadian National railways to the Eastern Car Co., Trenton, N. S., is a leading development in a generally quiet car market.

Pittsburgh—With a backlog at present of some 6000 tons of 110 and 130-pound rails in two orders, the Edgar Thomson rail mill is scheduled to resume about the middle of the month. However, it is expected that by the time operations commence additional tonnage will be added to this backlog. One of the orders scheduled for rails is for 5000 tons and the other for 1000 tons. This is the fourth rolling period the local rail mill has had this year, the last being about a month ago with the other two in May and August. Indecision of various other railroads as to their early 1933 needs still is noted, the only important inquiry being that of the Santa Fe railroad calling for 26,484 tons which will go to western mill. Spikes and tie plates are moving slowly and only an occasional carload is being released. Prices on railway materials are $40 per ton for standard open-hearth rails, 1.75c for tie plates and 2.40c for spikes. Absence of demand for light rails still is noted.

Cleveland—Railroads are sending out the usual forms for steel prices for first quarter, but give no indications of buying immediately. Current orders are limited to small lots for repairs. Chesapeake & Ohio railroad recently has released some track fastenings purchased last year, but no rails.

Philadelphia—Reading railroad has closed with three eastern mills for an additional 700 tons of car repair plates, and still has about 300 tons to place.

Car Orders Placed

Canadian National Railways, 500 all-steel gondolas, 70-ton capacity, to Eastern Car Co., Trenton, N. S.

Rail Orders Pending

Atchison, Topeka & Santa Fe railroad; 26,484 tons, purchase approved.

Bolt, Nut Prices Steady On First Quarter Needs

Bolt, Nut, Rivet Prices, Page 43

Pittsburgh—Most first quarter contracts are being returned signed by bolt, nut and rivet users without much discussion. Continuation of present prices applies for the first quarter, which means 75 off list discount for bolts and nuts and 2.25c, base, on large rivets.

Cleveland—Rivet manufacturers are sending out first quarter contracts at unchanged prices. Nut and bolt makers have booked some orders for January delivery, automotive and railroad business holding up fairly well, but other lines quiet. Nut and bolt discounts have been extended for first quarter, but a manufacturer here has issued a new list reducing base prices of small carriage and machine bolts 12 to 17 per cent, effective Dec. 1, and for first quarter.

Chicago—Bolt, nut and rivet specifications are holding well and show little change since a month ago. Orders from farm equipment manufacturers are more numerous. Although tonnage still is light, Jobbers are ordering sparingly and little business is appearing from railroads. Sales for some interests compare favorably with the volume a year ago. First quarter contracts are being issued with prices unchanged at 75 off for bolts and nuts and 2.35c, Chicago, for structural rivets.

Structural Shapes

Three Large Federal Jobs Swell Awards to 34,597 Tons, Second Largest Week of Year—State Bridges Also Yield Good Tonnages—Big Projects Pending

STRUCTURAL SHAPE PRICES, PAGE 43

Philadelphia—Approximately 6550 tons of structural shapes for the customs house here have been awarded to the McClintic-Marshall Corp., Bethlehem, Pa., and 8000 tons for the Archives building, Washington, are reported placed with an unnamed fabricator. The general market is quiet. While plain material is unchanged at 1.70c, base, nearest mill, the market is definitely easier.

New York—Bids close Jan. 6 on the superstructure for the federal courthouse, New York, taking about 10,000 tons. While awards are light, pending volume indicates a gradual improvement in structural buying. New York city work is uncertain due to financial limitations. Several eastern railroads are inquiring for first quarter requirements of shapes, plates and bars, including the Norfolk & Western, 2500 tons, Dec. 21. Bids are in on more than 3000 tons of New York state bridges.

Boston—Led by a 625-ton bridge in Maine, and a 520-ton postoffice at Portland, structural steel awards are heavier. Inquiry still is limited to public work.

Pittsburgh—Eleven hundred tons of shapes will be required for two bridges for Lycoming and Susquehanna counties, Pennsylvania, which will be bid at Harrisburg, Dec. 22. Mill books are open with 1.60c, Pittsburgh, to apply for first quarter, but there are no inquiries.

Cleveland—Awards of 11,200 tons of structural shapes for the Cleveland postoffice to Fort Pitt Bridge Co., Pittsburgh, features the market. Approximately 1000 tons for three Ohio state bridge jobs were placed; the state will open bids on some additional road work Dec. 23.

Chicago — Structural awards are headed by 2400 tons for the South Halstead street bridge here. Inquiries have moderated considerably. The market for plain material nominally is 1.70c, Chicago, which is being continued into first quarter.

Contracts Placed

11,200 tons, postoffice, Cleveland, to Fort Pitt Bridge Co., Pittsburgh, through Lundoff-Bicknell Co., Cleveland, general contractor.

8000 tons, Archives building, Washington; reported placed with unstated fabricator.

6550 tons, customs house, Philadelphia, to McClintic-Marshall Corp., Philadelphia.

2400 tons, South Halsted street bridge, Chicago, to Mt. Vernon Bridge Co., Mt. Vernon, O.

1700 tons, bridge, Kansas City, Mo., to Kansas City Structural Steel Co.; previously reported to Kansas City Bridge Co.

850 tons, state bridge, Tidioute, Pa., to Lackawanna Steel Construction Corp., Buffalo.

625 tons, bridge, Falmouth, Me., to Lackawanna Steel Construction Corp., Buffalo.

520 tons, postoffice superstructure, Portland, Me., to Ingalls Iron Works Co., Verona, Pa.; Poorvu-Heenan Construction Co., Boston, general contractor.

422 tons, postoffice, Beaumont, Tex., to Petroleum Iron Works, Beaumont; Algernon Blair, Montgomery, Ala., general contractor.

350 tons, highway bridges, Oklahoma, to Clinton Bridge Works, Clinton, Iowa.

350 tons, state bridge, Chesapeake, O., to Lackawanna Steel Construction Corp., Buffalo.

350 tons, state bridge, Franklin, O., to Lackawanna Steel Construction Corp., Buffalo.

340 tons, state viaduct, Thomaston, Conn., to Lackawanna Steel Construction Corp., Buffalo.

300 tons, mixing plant for Six Companies, Boulder City, Nev., to Consolidated Steel Corp., Los Angeles.

250 tons, state bridge, Woodville, O., to McClintic-Marshall Corp., Bethlehem, Pa.

244 tons, bridge, Washington county, Pennsylvania, to McClintic-Marshall Corp., Bethlehem, Pa.; through Rust Engineering Co., Pittsburgh, contractor.

215 tons, health unit No. 7, Boston to New England Structural Co. Boston.

200 tons, highway bridges, Mississippi, to Virginia Bridge & Iron Co., Roanoke, Va.

200 tons, bridge repairs for Southern Pacific at Gaviotta, Calif., to Virginia Bridge & Iron Co., Roanoke, Va.

200 tons, bridge, Pennsylvania railroad, Merchantville, N. J., to Phoenix Bridge Co., Phoenixville, Pa.

187 tons, highway bridges, Rome and Ellenville, N. Y., to Lackawanna Steel Construction Corp., Buffalo.

167 tons, building for Oscar Mayer & Co., Madison, Wis., to Lakeside Bridge & Steel Co., Milwaukee.

162 tons, shapes and bars, dormitory building, United States Southwestern Reformatory, El Reno, Okla.; 87 tons of shapes to Muskogee Iron Works, Muskogee, Okla.; 75 tons of bars to Concrete Engineering Co., Oklahoma City; W. S. Bellows Construction Co., Oklahoma City, general contractor.

150 tons, bridge, Arkadelphia, Ark., to Arkansas Foundry Co., Little Rock, Ark.

150 tons, market house, McKeesport, Pa., to American Bridge Co., Pittsburgh.

100 tons, or more, postoffice, Merced, Calif., to Minneapolis-Moline Power Implement Co., Minneapolis; North-Moller Co., Jackson, Mich., contractor.

125 tons, highway bridge, Champaign county, Illinois, to Vincennes Bridge Co., Vincennes, Ind.

Awards Compared

	Tons
Awards, week ended Dec. 10	**34,597**
Awards, week ended Dec. 3	**11,448**
Awards, week ended Nov. 26	**8,494**
Awards, this week in 1931	**19,815**
Av. weekly awards, 1931	**34,236**
Av. weekly awards, 1932	**16,510**
Av. weekly awards, Nov.	**11,468**
Awards, to date, 1931	**1,725,983**
Awards to date, 1932	**823,510**

Contracts Pending

2500 tons, shapes, plates and bars, for first quarter, Norfolk & Western railroad, bids Dec. 21. Also closing on same date for first quarter locomotive steel tires.

2200 tons, naval hospital, Philadelphia; John McShane, Philadelphia, low for general contract; bids Dec. 5

1400 tons, highway bridges, New York.

1000 tons, 11 buildings at Fort Miley, Calif., bids Dec. 20.

750 tons, grade crossing, Baltimore & Ohio railroad, Staten Island, N. Y.

700 tons, highway bridges, Oklahoma.

700 tons, five 180 foot spans, Bonner's Ferry state bridge, Idaho; Puget Construction Co., Seattle, low.

700 tons, Mississippi river lock No. 5, Fountain City, Wis.; Edward E. Gillen Co., Milwaukee, low for general contract. Contract also calls for 90,445 square feet of sheet piling, 375 tons of concrete bars, 390 tons of castings, and operating machinery.

675 tons, highway bridges, Nebraska; Arkansas Bridge & Iron Co., Milwaukee, low on 350 tons; Pittsburgh-Des Moines Steel Co., Pittsburgh, low on 325 tons.

603 tons, state bridge, Lycoming county, Pennsylvania; bids at Harrisburg, Dec. 22; included 87 tons of plain steel bars.

488 tons, state bridge, Susquehanna county, Pennsylvania; bids at Harrisburg, Dec. 22; includes 83 tons of plain steel bars.

450 tons, highway bridges, Iowa.

300 tons, government lock gates, Fern Bank, O.

250 tons, highway bridges, Williamsfield, Ill.

250 tons, state hospital, Rochester, N. Y.

200 tons, shapes and bars, postoffice, Sarasota, Fla.; Joseph A. Tintari, Chicago Heights, Ill., low.

200 tons, bascule bridge over Chesapeake and Delaware canal, Delaware City, Del.; bids Dec. 15.

150 tons, one 40-ton, one 20-ton and three 5-ton overhead traveling cranes for United States bureau of reclamation, Denver; specification 586-D; bids Dec. 20.

150 tons, San Francisco-Oakland bridge, contract No. 2; bids Feb. 2.

Concrete Bars

Awards Featured by 1500 Tons for Washington Archives Building—1365 Tons Being Closed for Northern Ohio Bridge—Road Requirements Growing Lighter

REINFORCING BAR PRICES, PAGE 43

New York—For a highway bridge and pavement in Monroe county, New York, approximately 225 tons of concrete bars have been placed, while several hundred tons more are active for New York state bridges and highways, bids closing Dec. 6 and 20. Prices on small orders are steady, but concessions are allowed on the larger lots.

Boston—The market for billet and rerolled steel bars is sluggish. Prices, although untested, are unchanged on the current volume.

Philadelphia—Delay continues to mark the placing of several sizable orders for reinforcing bars. New inquiry is light. Cut lengths generally are 1.45c to 1.55c, Pittsburgh.

Pittsburgh—Several large government jobs have been figured the past week. About 185 tons of plain steel bars will be required for bridge work in Lackawanna, Lycoming and Susquehanna counties, Pennsylvania, bids on which will be opened by the state Dec. 22. Steel in the 110-ton Washington county bridge in the letting of Nov. 18 has been bought. Requirements for the Negley run sewer, Pittsburgh, now are estimated at 300 tons, with General Contracting Corp., Pittsburgh, expected to buy the bars soon. New billet steel bars continue nominal at 1.60c.

Chicago—Reinforcing bar shipments continue to decline as weather conditions restrict construction work, particularly road paving. New inquiry is light and action on tonnages for Indiana and Illinois highway work is deferred. Few private projects are appearing. Reinforcing bar prices continue weak, the nominal market being 1.50c to 1.60c for billet bars, and 1.20c to 1.30c for rail steel.

Cleveland—Highway Construction Co., Cleveland, is placing 1365 tons of concrete bars for the Brook Park village, Cuyahoga county, Ohio, bridge. Other awards are light, and volume lower than in recent weeks. On straight lengths of new billet steel bars 1.45c to 1.50c generally is quoted, though large tonnage develops concessions.

Contracts Placed

1500 tons, Archives building, Washington, to Capitol Fireproofing Co., Washington; through Geo. A. Fuller Co., New York, contractor.

225 tons, mainly pavement reinforcing, Ballantyne bridge and highway, Genesee Park highway, Monroe county, New York, to Kalman Steel Corp., Bethlehem, Pa.; Warren Bros. Roads Co., Cambridge, Mass., general contractor.

214 tons, postoffice, Beaumont, Tex., to Connors Steel Co., Birmingham, Ala.; Algernon Blair, Montgomery, Ala., general contractor.

211 tons, state bridges and approaches, highway 4, Runnels county, Texas, to Southern States Steel Corp.; Bontke Bros., Abilene, Tex., general contractors.

135 tons, bars and shapes, postoffice, Bristol, Va.; 77 tons of bars to Knoxville Iron Co., Knoxville, Tenn.; 58 tons of shapes to Bristol Steel & Iron Works, Bristol, Va.; Algernon Blair, Montgomery, Ala., general contractor.

125 tons, hospital, Clarksdale, La., to Laclede Steel Co., St. Louis.

110 tons, Pennsylvania state bridge, Washington county, to Kalman Steel Corp., Bethlehem, Pa.; through Rust Engineering Co., Pittsburgh.

100 tons, West Point, N. Y., to Concrete Steel Co., New York.

Contracts Pending

1900 tons, San Francisco-Oakland bridge, contract No. 2; bids Feb. 2.

400 to 500 tons, 11 buildings at Fort Miley, Calif., bids Dec. 20.

375 tons, Mississippi river lock No. 5, Fountain City, Wis.; Edward E. Gillen Co., Milwaukee, low for general contract.

300 tons, Negley run sewer, Pittsburgh, General Contracting Corp., Pittsburgh, contractor. Revised from 200 tons previously printed in STEEL.

250 tons, infantry barracks, Plattsburg, N. Y.

226 tons, state highway work, Alameda county, California; bids Dec. 21.

185 tons, bridge work in Lackawanna, Lycoming and Susquehanna counties, for Pennsylvania state highway department; bids at Harrisburg, Pa., Dec. 22.

165 tons, Bonner's Ferry state bridge, Idaho; Puget Construction Co., Seattle, Low.

Unstated, 265-foot concrete span, state project, Klickitat county, Washington; bids Dec. 20.

Awards Compared

	Tons
Awards, week ended Dec. 10	2,620
Awards, week ended Dec. 3	2,027
Awards, week ended Nov. 26	2,239
Awards, this week, 1931	5,700
Av. weekly awards, 1931	6,808
Av. weekly awards, 1932	4,018
Av. weekly awards, Nov.	2,238
Awards, to date, 1931	352,020
Awards to date, 1932	200,905

Science More Advanced In Production than Sales

The use of science in production management has stepped far ahead of its use in sales management, declared Sanford E. Thompson, president of the Taylor society, at the annual dinner of the society in New York, Dec. 8.

At one of the sessions of the meeting from Dec. 7 to 9, Dr. H. S. Person, managing director of the society, stressed the need for the rise of strong and capable men to lead the nation out of depression.

The man out of work is fighting against curtailed and upset employment conditions, but nevertheless has a certain responsibility for his own unemployment, said E. Hayden Hull, management consultant.

A financial plan for the security of employes, based upon the creation of personal reserves, was presented to the society by Ralph S. Westing, of Young & Ottley, New York.

Foreign Trade Tips Add $47,000,000 to Business

Trade promotional activities of the bureau of foreign and domestic commerce, Washington, resulted in business valued at more than $47,000,000, according to the annual report of Frederick M. Feiker, director.

Achievements of the bureau in the fiscal year of 1932 include a commercial survey of the Pacific northwest, a study of hardware distribution in the Gulf southwest, a study of commodity movements by railroad and motor trucks, and considerable assistance to small industries in building up export business.

Urges Immediate Purchasing

In approving the President's rehabilitation plan, being worked out by a committee under A. W. Robertson, of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., to rehabilitate industry for the purpose of affording employment, Louis Allis, president, the Louis Allis Co., Milwaukee, urges that the equipment and raw materials required for such rehabilitation be placed immediately. Otherwise, Mr. Allis con-

tends, the extensive re-employment which is the objective cannot be effected.

Financial News of Steel Industry

McKeesport Tin Plate Co., McKeesport, Pa., has declared a regular quarterly dividend of $1, payable Jan. 1 to record Dec. 15.

□ □ □

Newton Steel Co., Cleveland, reports net loss of $306,594, after charges, in the third quarter, compared with $220,811 in the second quarter. Net loss for nine months of 1932 is $653,537, compared with $383,083 a year ago.

No "Boom" in Iron Ore Mining Is Seen for 1933

Iron Ore Prices, Page 50

Cleveland—Lake Superior iron ore producers see some improvement in shipments for 1933, but certainly nothing like a "boom" in ore production such as predicted recently by the president of one of the northwestern railroads. Stocks at lower lake ports and furnaces Dec. 1, according to reports now being compiled, were approximately 32,100,000 tons. Last year the amount was 39,200,000 tons, and the nine-year average, including 1931, for Dec. 1, was 41,280,000 tons.

If the view stops there the prospects look good, but consumption on the rise in November was only 700,000 tons, and at this rate for the next five months will amount to 3,500,000 tons. This would leave 28,600,000 tons on hand May 1, or approximately 8,600,000 tons above the normal average for that date. The stocks May 1, 1932, were 33,400,000 tons.

Some producers point out that there is enough ore on hand to supply requirements at the November rate for nearly four years, but allowing for the fact that certain grades must be replenished to provide necessary mixtures, the stocks are reduced to the equivalent of 31 months. In the Lake Superior district stocks are unusually heavy, so that mining will not "boom" in 1933.

As previously reported, lake shipments in 1932 were 3,567,985 tons. The record for recent years follows:

1923	59,036,705	1928	53,980,874
1924	42,623,572	1929	65,204,600
1925	54,081,298	1930	46,582,982
1926	58,537,855	1931	23,467,786
1927	51,107,136	1932	3,567,985

Pipe

Demand Is at Lowest Point of Year—150-Mile Water Line Is Possibility in Minnesota

PIPE PRICES, PAGE 56

Chicago—An eastern pipe fabricator is making a survey to determine possibilities of laying a water line from Lake Superior to Minneapolis, about 150 miles, although this project is not expected to materialize in the near future. Few orders or inquiries are appearing in the cast pipe market, and active jobs rarely involve more than 100 tons. Springfield, Ill., and Ft. Wayne, Ind., each will require 100 tons for waterworks construction. Prices are steady but untested.

Boston—Bids are in on a small lot of wrought iron pipe for the department of public works, Boston, and another inquiry for cast pipe is expected this month. Prices are holding around $30, local foundry. Bangor, Me., has bids on about 250 tons.

New York—Several hundred tons of cast pipe for state highway work will be closed Dec. 20. Several gas utilities, having bids on cast iron and steel pipe, are expected to place partial requirements for next year this week. The navy is closing this week on a substantial tonnage of standard pipe for the East.

Philadelphia — A South Chester, Pa., mill is reported to have booked 600 tons of pipe for the Thirtieth street postoffice, Philadelphia. Otherwise the pipe market is quiet.

Pittsburgh—The movement of tubular products so far this month is no better than it was in November, the lowest of the year. Shipments of mechanical tubing to the automotive industry represent the largest demand. Seamless tubing requirements are greatly curtailed.

Birmingham, Ala. — Pipemakers are confident of improvement in business with the new year. Current awards are light.

Cast Pipe Placed

319 tons, 6 to 10-inch class 150 to 200, Burbank, Calif., allocated as follows: American Cast Iron Pipe Co., Birmingham, Ala., 180 tons; National Cast Iron Pipe Co., Emaus, Pa., 139 tons.

305 tons, 12-inch, quartermaster corps, Fort Monroe, Va., to American Cast Iron Pipe Co., Birmingham, Ala.

Cast Pipe Pending

250 tons, small sizes, Bangor, Me.; bids in.

100 tons, various sizes, Springfield, Ill., waterworks; bids Dec. 12.

100 tons, various sizes, Ft. Wayne, Ind., pump station.

Wire Buying Lighter; Farm And Jobber Needs Lag

Wire Prices, Page 43

Chicago—Wire demand continues to drift downward, with activity approaching the low level reached at midsummer. Adverse weather conditions may have a further depressing effect upon business in agricultural districts. Producers are continuing present prices of $2 for carload lots of wire nails, and 2.25c for plain wire into first quarter, with forward buying quiet.

Worcester, Mass.—Wire demand in some departments is smaller, although one district mill is fairly active on low carbon wire. Prices are unchanged and steady. Utility and electrical requirements are light. A New Haven, Conn., mill has booked several fair government rope contracts. Imports of barbed wire for mail order houses through Boston have been fairly heavy.

Pittsburgh—All wire producers opened books last week for first quarter. There were no price changes in important wire products, with nails quoted uniformly at $1.95 a keg for carloads and manufacturing wire 2.20c. Specifications continue lght, especially so for jobbers.

Cleveland—Some orders have been received for delivery after the first of the year, consumer not wishing to increase stocks during inventory. Current prices, reaffirmed for first quarter, apply on these orders. Shipments this month probably will mark the low point of the year. Republic Steel Corp. has been awarded 500,000 noncorrosive wire rope clips for the United States engineer at Vicksburg, Miss., at $18,575, delivered.

Perkins Machine & Gear Co., Springfield, Mass., has fitted part of its plant for use in metal spraying. Territorial rights to the process have been acquired from the Central Specialty Co., Westfield, Mass. It is used in building up worn machine parts to apply corrosion-resistant materials and to ornament metallic articles instead of plating.

Strip

Orders in Smaller Volume and Production Is Reduced—Some Forward Business Is on Books

STRIP PRICES, PAGE 43

Pittsburgh—Hot-rolled orders have fallen off and specifications are in such small amounts that little improvement is forecast for December. Made up mainly of narrow hot-rolled sizes, strip orders are insufficient to engage 15 per cent of mill capacity. Firmness is noted in the 1.45c price for hot-rolled with cold-rolled strip continuing 2.00c in most instances. One producer scheduled strip operations beginning Dec. 7 for a few days last week.

New York—Strip sellers see little likelihood of an improvement over the existing dull volume of trading before next year. Meanwhile, hot-rolled is 1.45c, Pittsburgh, and cold-rolled at 2.00c.

Philadelphia—Steel strip is listless in face of no demand and prices are nominally unchanged.

Cleveland—A few additional small orders from automotive stampers were received during the week, but tonnage from this source is tapering. In other respects, also, the market has a quieter tone, inquiries and orders for first quarter lacking. Hot-rolled strip holds at 1.45c to 1.50c, Pittsburgh; and cold-rolled at 1.90c to 2.00c, base, Cleveland.

Chicago — Strip steel specifications are fairly steady, the decrease in orders the past several weeks having been moderate. Little additional improvement is looked for in demand from the automotive industry, while miscellaneous consumers are expected to be lighter buyers for the remainder of the month. Some forward business is being received. The market continues 1.55c, Chicago, for hot strip and 2.00c, Pittsburgh-Cleveland, for cold-rolled strip.

Operations Slip to 15 Per Cent; Pittsburgh Gains

Pittsburgh—A minor and contrary expansion of one point in the ingot rate occurred last week to a 17 per cent average. Operations of 19 per cent in a leading mill were a gain, but were moderated by a 15 per cent rate in another large producer's mills. For this week a continuation of 17 per cent average seems likely, as the local rail mill here is scheduled to resume shortly. Blast continues to blow in eight out of 53 steelworks blast furnaces, four being Carnegie furnaces and the other four being two independents.

Philadelphia—Steelmaking operations have eased off a half point to 12 to 13 per cent.

Buffalo—Barring a last minute readjustment of schedules, only four open-hearth furnaces will be active this week and the operating rate will be down to 11 per cent. This is less than half of the peak reached in the last week of November. Two plants which planned to be down the last three weeks of the year now intend to operate, and the current 11 per cent rate may hold the remainder of this month.

Operations, week ended Dec. 10	**15**
Operations, week ended Dec. 3	**16**
Operations, week ended Nov. 26	**17.5**
Operations, one year ago	**25.5**
High for 1932, Feb. 6	**28.5**
Low for 1932, July 9	**12**

Youngstown, O.—Operations here dropped one point last week to 15 per cent, and may be down to 14 per cent this week as sheet and strip mill activity is definitely lower and pipe output is slackening. Nineteen out of 83 open-hearth furnaces are melting, against 20 a week ago.

Cleveland—Steel ingot production here for the week ended Dec. 10 was at 27½ per cent, down from 30 per cent in the preceding week. The rate for the first half of last week was 26 per cent, but Otis Steel Co. then stepped up from three to four active open hearths. Corrigan, McKinney Steel Co. and American Steel & Wire Co. each continued with three active. No change is now scheduled for the current week.

Chicago—Ingot production has declined to near its midsummer low, output the past week being around 12 per cent. Little change is in immediate prospect, with further reductions not unlikely over the end of the month. Pig iron production is steady, eight of 36 furnaces continuing in blast, the same as during the past several months. Finishing mill schedules are tending downward.

Birmingham, Ala.—Steelmaking operations are estimated at less than 15 per cent, open-hearth furnace operations varying as demand warrants.

Warehouse Trade Tapers As Year Nears End

Warehouse Prices, Page 56

New York — Warehouse volume is running slightly ahead of last month, but improvement is small. Orders are fairly numerous, but lack size. Prices are unchanged and fairly steady.

Boston—Warehouse volume continues to drag, with little change expected the remainder of the year. Orders to jobbers are small. Prices are generally unchanged, but German nails are offered well below the listed warehouse price by some sellers.

Philadelphia—Warehouse trading is easier, reflecting season influences. Business this year is off about 35 per cent in dollars value and somewhat more in point of tonnage. Prices are unchanged.

Pittsburgh—Bookings of steel products by local jobbers have been disappointing the first week in December. From all indications the entire month may be as slow as last summer. No change is reported on prices of steel products from stock.

Detroit—Warehouse business in iron and steel continues at about the late November rate, with no pickup probable until January. Prices are unchanged.

Cincinnati — Demand for warehouse steel is showing the customary pre-holiday decline. Orders are small and in reduced volume. Prices are unchanged since new schedules on boiler tubes were announced.

Chicago—Sheet prices have been reduced by warehouses here $2 to $7 per ton. Blue annealed now are quoted at 2.75c to 2.90c, according to width; black at 3.45c; galvanized at 3.75c for Chicago delivery and 3.50c outside Chicago

St. Louis—Somewhat greater than the usual seasonal contraction is noted in demand for iron and steel from warehouses. Mild weather has served to hold down the call for sheets, tubular goods and other cold weather items. Road construction materials still are fairly active, and there is a moderately active demand for commodities for municipal improvement.

H. P. Gazzam Machine Co., Pittsburgh, has been awarded valve blades and shafts for an Ohio river lock, at $5904, by government engineers at Huntington, W. Va.

RAW MATERIAL PRICES

Delivered pig iron prices subject to 10 per cent freight surcharge, maximum 13.44c gross ton, from Jan. 4

Asterisk denotes price change this week

Pig Iron

Per Gross Ton

FOUNDRY, NO. 2

Chicago, furnace	$15.50
Pittsburgh, dist. fur.	15.00
Pittsburgh, delivered	15.63 to 16.13
Valley furnace	14.50 to 15.00
Cleveland fur., local del.	15.00
*Philadelphia, delivered	13.26 to 13.76
Virginia furnace	17.25
Granite City, Ill., fur.	16.50 to 17.50
Buffalo, fur., local del.	16.00
Buff., all-rail, Boston	18.91 to 19.91
Buff., all-rail, Brooklyn	18.90
Buff., all-rail, Newark	17.28
Ala., Bir. fur., local del.	11.00
Ala., Nor. del., Bir. base	10.00
Alabama, del. Chicago	16.01
Alabama, del. St. L.	14.42
Alabama, del. Cincinnati	13.82
Ala., Phila., dock del.	15.00 to 15.25
Ala., Balt., dock del.	15.00
Alabama, New York dock	15.50
Ala., Boston dock del.	15.75 to 16.75
Tenn., Bir. base, local del.	13.00
Tennessee, del. Cinn.	13.82
Montreal, delivered	23.00 to 23.50
Toronto, delivered	22.10

FOUNDRY, NO. 2X

Buffalo, fur., local del.	16.50
Buff., all-rail, Brooklyn	19.40
Buffalo, all-rail, Newark	17.78
Buff., all-rail, Boston	19.91 to 20.91
Virginia furnace	17.75
Eastern, del. Phila.	13.76 to 14.26

FOUNDRY, NO. 1X

Buffalo fur., local del.	17.50
Eastern, del. Phila.	14.26 to 14.76

MALLEABLE

Valley furnace	14.50 to 15.00
Cleveland fur., local del.	15.00
Pittsburgh dis. fur.	15.00
Pittsburgh, delivered	15.63 to 16.13
Chicago, furnace	15.50
Buffalo fur., local del.	16.50
Eastern Penna, delivered	14.63 to 18.91
Granite City, Ill., fur.	16.50 to 17.50
Montreal, delivered	24.00
Toronto, delivered	22.60

BASIC

Pittsburgh, district fur.	14.00
Pittsburgh, delivered	14.63 to 15.13
Eastern Penn., del.	13.50
Buffalo fur., local del.	15.50 to 16.00
Montreal, delivered	23.50
Valley, furnace	14.00

BESSEMER

Valley furnace	14.50 to 15.00
Pittsburgh, furnace	15.00
Pittsburgh, delivered	15.63 to 16.13

LOW PHOS.

Valley fur., standard	25.00
Philadelphia, standard	23.76 to 26.79
Copper-bear., E. Pa. fur.	21.50 to 23.00

GRAY FORGE

Valley furnace	14.00
Pittsburgh district fur.	15.00
Pittsburgh, delivered	15.63 to 16.13

CHARCOAL

Lake Superior, del. Chicago	23.04

SILVERY

Jackson County, O., fur. in per cents: 6—$18; 7—$18.50; 8—$18.75; 9—$19; 10—$19.50; 11—$20; 12—$20.50; 13—$21.50; 14—$22.50; 15—$23; 16—$24; 17—$25.50.

Pittsburgh and Buffalo furnace: 7 to 10—$19; 15—$21 to $23.

BESSEMER FERROSILICON

Jackson County, O., fur., in per cents: 10—$20.50; 11—$21; 12—$21.50; 13—$22.50; 14—$23.50; 15—$24; 16—$25; 17—$26.50.

Coke

Prices Per Net Ton

BEEHIVE OVENS

Connellsville furnace	$1.75 to 2.00
Connellsville foundry	2.50 to 4.25
New River foundry	6.00
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.25

BY-PRODUCT FOUNDRY

Newark, N. J., del.	8.21 to 8.81
Chicago, ovens, outside del.	7.00
Chicago, del.	7.75
New England, del.	10.00
St. Louis, del.	7.75
Birmingham, ovens	4.00
Indianapolis, del.	7.75
Ashland, Ky., ovens, Connell., basis	4.50
Portsmouth, O., ovens Connell., basis	4.50
Buffalo, ovens	7.50 to 8.00
Detroit, ovens	8.00
Philadelphia, del.	8.50

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½%, Lower Lake Ports

Old range bessemer	$4.80
Mesabi bessemer	4.65
Old range nonbessemer	4.65
Mesabi nonbessemer	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania New Jersey furnaces

(Nominal)

Foundry and basic, 56-63%, contract	7.50
Copper-free low phos. 58-65%	nom.

FOREIGN ORE

Cents per units, alongside docks Atlantic ports

(Nominal)

Foreign manganiferous ore, 45-55% iron, 6-10% man.	8.50 to 9.00
North African low phos.	7.50 to 8.50
Swedish basic, 65%	7.50 to 8.00
Swedish low phos.	9.00
Spanish, North African basic, 50 to 60%	7.00 to 8.00
Newfoundland fdy., 55%	8.00
Tungsten, spot, short ton unit, duty paid	$10.00 to 10.25
Chrome ore, 48% gross ton c.i.f.	$17.00 to 18.00

Manganese Ore

(Nominal)

Prices, not including duty, are cents per unit; cargo lots.

Caucasian, 52-55%	24 cents
South African, 52%	22 to 23 cents
South African, 49-51%	21 to 22 cents
South African, 44-47%	20 to 21 cents
Indian, 48-50%	22 cents
Brazilian, 46-48%	18 cents

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pennsylvania, Ohio, Illinois, Kentucky, Maryland, Georgia, Alabama	$35.00
*Missouri	30.00

Second Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	25.00 to 30.00
Georgia, Alabama	30.00

SILICA BRICK

Pennsylvania	$35.00
Joliet and East Chicago	47.00
Birmingham, Ala.	50.00

MAGNESITE BRICK

Per Net Ton

Burned, 9 x 4½ x 2½	$61.50
Unburned, 9 x 4½ x 2½	52.00

CHROME BRICK

Per Net Ton

F.o.b. shipping point	$42.50

MAGNESITE

Dead burned grain, net ton, Chester, Pa., or Baltimore bases	38.00
Domes, Chewelah, Wash., base	20.90

Semifinished Steel

Prices Per Gross Ton

BILLETS AND BLOOMS

4 x 4-inch base

Pittsburgh, open-hearth	$26.00
Pittsburgh, bessemer	26.00
Youngstown	26.00
Cleveland	26.00
Philadelphia	31.75
Chicago	26.00
Forging, Chicago	31.00
Forging, Pittsburgh	31.00
Forging, Philadelphia	35.75

SHEET BARS

Pittsburgh	26.00
Youngstown	26.00
Cleveland	26.00
Chicago	28.00

SLABS

Pittsburgh	26.00
Youngstown	26.00
Cleveland	26.00

WIRE RODS

Pittsburgh, Cleveland	$37.00
Chicago	38.00

SKELP

All grades, Pittsburgh	1.50c to 1.60c

Ferroalloys

(In dollars, except Ferrochrome)

Ferromanganese, 78-82%, tidewater, duty paid	$68.00
Ferromanganese, del. Pittsburgh	73.24
Spiegeleisen, 19-20%, domestic fur. spot†	24.00
Ferrosilicon, 50 per cent, freight all., c. l.	77.50
Do, less carload	85.00
Do, 75 per cent	126.00 to 136.00
Silicomang., 2½% carb.	105.00
2% carbon	110.00
1% carbon	115.00
(The above for spot carlots. Contract price $5 a ton less).	
Ferrochrome, 60-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Do, for spot delivery	10.50
Ferrotungsten, stand., lb. cont.	1.00 to 1.10
Ferrovanadium, 30-40 per cent, per lb. contained, on analysis	3.05 to 3.30
Ferrotitanium, c.l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt., all., lb.	8.50
Do, under 1 ton	9.00
Ferrophosphorus, per ton, carload 17-19 per cent, Rockdale, Tenn., basis; 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic per ton carload, 23-26% f.o.b. Anniston, Ala.; 24%, $2.75 unitage	65.00
Ferromolybdenum, stand. 50-60 per cent, per lb.	0.95
Cal. Molybdate, lb. cont.	0.80
Molybdate, lb. cont.	0.80

†Carloads. Differentials apply to quant.

Fluorspar

85 and 5 per cent grade

Washed gravel, f.o.b. Ill., Ky., net ton car loads	$12.00
Washed gravel, import duty paid tide, gross ton	18.50

Pig Iron

Demand Tapers in All Districts —Some Radiator Units More Active—Southern Output Down

PIG IRON PRICES, PAGE 50

Pittsburgh—Shipments continue to a few melters. Several radiator plants have been buying less, recently, except one producer at Uniontown, Pa., which resumed operations. A large radiator company's Pittsburgh subsidiary is expected to reopen, as it is reported inquiring for coke. The Butler, Pa., interest is releasing several thousand tons of basic monthly on old contracts. Plans of a foundry near here call for the use of more scrap, which will eliminate a fair shipment of pig iron in the near future. Prices continue nominal at $15, Pittsburgh district furnace, for bessemer, foundry and maleable grades.

Boston—Weak foreign exchanges give some imported iron further price advantages. Dutch continues to move at $14, delivered, near storage, and Indian at $15, dock. The local furnace holds to its $16 minimum. Sales are light.

New York—Sellers look for little improvement until after Jan. 1. Buffalo foundry iron is untested but easy at $14, furnace, with eastern Pennsylvania iron $12.50 to $13, furnace. A cargo of malleable iron from Holland is scheduled to arrive soon at Bridgeport, Conn., on a contract placed by a New Britain consumer. Royal Dutch foundry iron continues to compete actively in this district.

Buffalo—Small orders are being placed for first quarter. The price for local delivery continues $16, base, furnace. Shipments are falling off.

Cleveland—Shipments this month from lake furnaces evidently will compare favorably with those in November, but will not be as large as October's. Some producers believe their shipments this month will be larger than in November, due mainly to a pickup in demand from automotive foundries. Gains this month would reverse the usual seasonal trend. Sales continue at the low point of the year. Competition in outside territory is keener. Locally, the market holds at $15, base, furnace.

Cincinnati—An order for 500 tons of northern foundry iron for an Indiana melter increased the week's sales to about 1000 tons. Current shipments indicate a slightly lower melt.

Chicago—Pig iron shipments are declining more sharply as the result of reduced requirements of leading consumers, and although the movement this month is expected to hold above the low level reached in August, most of the gains noted in October and November are likely to be surrendered. New business is rather encouraging, showing a moderate improvement during the past week. This indicates an upturn in deliveries after the turn of the year. Prices continue $15.50, furnace, for No. 2 foundry and malleable.

Philadelphia — Eastern foundry iron has dropped 25 cents to $12.50 to $13, base, furnace. Business is devoid of outstanding tonnages.

St. Louis—Inquiry for first quarter is the lightest on record for this period. Sales in the week amounted to about 600 tons. Shipments this month will be on a parity with those of November.

Birmingham, Ala.—Further reduction in pig iron output is forcast for this month. Demand is extremely light, and shipments prompt. Prices are steady.

Toronto, Ont.—The greater part of demand for pig iron is from small foundries, with volume low, and no contracting for future delivery. Prices are firm.

Ferroalloys Quiet

Ferroalloy Prices, Page 50

Demand for ferromanganese continues light and sellers generally have not opened books for first quarter, though expected to do so shortly. The current market is $68, duty paid. Domestic spiegeleisen sellers report little first half inquiry, although their books are open, with future contracts subject to individual negotiation. Spot is holding at $24, furnace, for carlots, the price established early last month.

Are Awarded Navy Steel

San Francisco—Latrobe Electric Steel Co. and the Republic Steel Corp. have divided a contract for corrosion-resisting steel for the Puget Sound, Wash., navy yard, bids opening Oc. 18. The award to the former aggregated $1958.90, delivered, and the latter $1078.42.

Universal Products Machine Co., 3242 North California avenue, Chicago, has changed its name to Novelty Lighter Corp.

Coke

Shipments to Foundries in Middle West Sustained Fairly Well —Heating Grades Active

COKE PRICES, PAGE 50

Pittsburgh — Common grades of beehive foundry coke bring $2.50 to $3 in a quiet market. Premium brands are $4 to $4.25. Furnace coke is moving at around $1.75. Inactivity at local foundries has resulted in reduced coke orders.

New York—Metallurgical coke buying remains light, with foundries generally operating at 15 to 18 per cent. Beehive furnace coke is unchanged at $1.50 to $2, and $2 to $2.15, Connellsville, for heating and smelting purposes, respectively. Beehive foundry coke is $2.75 to $4.25, western Pennsylvania ovens, depending upon grade. By-product foundry coke is $8.21 to $8.81, Newark, N. J.; $10, New England; and $8.50, Philadelphia.

Cincinnati—Shipments of foundry coke have decreased from the September and October rate. Domestic grades, however, are more active.

Chicago—Shipments of by-product foundry coke are well maintained and December tonnage is expected to compare favorably with that of November despite a moderate decline in foundry operations. First-quarter contracting is fairly well completed, the market continuing $7 ovens for outside delivery, and $7.75, delivered, Chicago. Domestic heating coke requirements have increased.

St. Louis—Demand for metallurgical coke is at a low ebb. Contracting for first quarter is almost entirely lacking, and by-product interests do not look for any expansion in sales for some time. Deliveries of foundry coke have dropped.

Birmingham, Ala. — Spot business indicates industrial plants will continue through this month at their present low rate of operations. Few orders are being booked for January.

Scrap

Weakness Carries Prices Down As Buying Is Suspended—Most Users Remain Out of Market

Chicago—Price weakness predominates in the local scrap market, which is characterized by almost complete suspension of activity. New buying is extremely light and shipments against the few orders outstanding are deferred or sharply curtailed. Absence of demand makes quotations almost entirely nominal, but the tone of the market is easier. Heavy melting steel is off 25 cents, while compressed sheets and some miscellaneous grades are quoted lower.

Boston—Scrap demand is listless, most buying being for barge loading for eastern Pennsylvania, including one load of stove plate. Worcester is taking small tonnages of No. 1 and 2 steel. Cast grades are slow. New England foundries are buying little.

New York—New business in iron

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	6.50 to	7.50
Boston, dealers	3.25 to	3.75
Buffalo, No. 1	7.50 to	8.00
Buffalo, No. 2	6.25 to	6.75
Chicago	5.25 to	5.75
Cleve., No. 1	7.00 to	7.50
Cleve., No. 2	6.00 to	6.50
Det., No. 1 deal.	4.50 to	5.00
Det., No. 2 deal.	3.00 to	3.50
E. Pa. del. mill		6.50
E. Pa., No. 2 del.	5.00 to	5.50
N. Y. deal. R. R.	4.50 to	4.75
N. Y. deal. No. 2		3.00
N. Y. deal. yd.	2.50 to	3.00
Pitts. No. 1	8.50 to	9.00
St. L. No. 1 sel.	5.75 to	6.00
Federal, Ill.	5.50 to	6.00
Granite City, Ill.	5.00 to	5.50
Valleys, No. 1	8.50 to	9.00

COMPRESSED SHEETS

Buffalo, dealers	6.25 to	6.75
Chi. (Factory)	4.00 to	4.50
Cleveland	6.50 to	7.00
Detroit, dealers	4.00 to	4.50
E. Pa. new mat.	5.00 to	5.50
Pittsburgh	8.50 to	9.00
Valleys	8.25 to	8.75

BUNDLED SHEETS

Buffalo	4.25 to	4.75
Cinci., del.	4.25 to	4.75
Cleveland	4.50 to	5.00
Eastern, Pa.		5.00
Pittsburgh	7.50 to	8.00
St. Louis	1.50 to	2.00

SHEET CLIPPINGS LOOSE

Chicago	2.00 to	2.50
Cincinnati	2.00 to	2.50
Detroit, dealers	1.25 to	1.75
St. Louis	1.50 to	2.00

STEEL RAILS SHORT

Birmingham	7.50 to	8.50
Boston, dealers	2.75 to	3.00
Buffalo	9.50 to	10.00
Chicago (3 ft.)	7.50 to	8.00
Chicago (2 ft.)	8.00 to	8.50
Cinci., del.	9.00 to	9.50
Detroit, deal.	8.00 to	8.50
Pitts. (open-hearth, 3 ft. and less)	10.50 to	11.00
St. Louis	7.00 to	7.50

STOVE PLATE

Birmingham	5.75 to	6.25
Boston, dealers	2.50 to	3.00
Buffalo	7.75 to	8.00
Chicago, net	5.50 to	6.00
Cinci., deal. net	3.50 to	4.00
Det., net deal.	2.50 to	3.00
Eastern Pa.	6.00 to	6.50
N. Y., deal. mill	2.50 to	3.00
St. Louis	5.50 to	6.00

COUPLERS, SPRINGS

Buffalo	9.00 to	9.50
Chicago	6.50 to	7.00
Eastern Pa.		8.50
Pittsburgh	9.50 to	10.00
St. Louis	6.00 to	6.50

ANGLE BARS—STEEL

Chicago	7.00 to	7.50
St. Louis	6.00 to	6.50

LOW PHOSPHORUS

Buffalo, billets and bloom crops	9.00 to	9.50
Cleveland bil. and bloom crops	10.00 to	11.00
Eastern Pa.		8.50
Pittsburgh billet bloom crops	10.50 to	11.00
Pitts., sheet bar crops	10.50 to	11.00

FROGS, SWITCHES

Chicago	5.50 to	6.00
St. Louis	5.75 to	6.00

SHOVELING STEEL

Chicago	5.25 to	5.75
Cleveland	5.75 to	6.00
St. Louis	5.00 to	5.50

RAILROAD WROUGHT

Birmingham	4.50 to	5.50
Boston, dealers	1.00 to	1.50
Buffalo, No. 1	4.50 to	5.00
Buffalo, No. 2	7.00 to	7.50
Cinci., No. 2	5.25 to	5.75
Chi., No. 1, net	4.50 to	5.00
Chicago, No. 2	5.50 to	6.00
Eastern Pa.		6.50
N. Y., No. 1, deal.	2.50 to	3.00
Pitts., No. 2	8.50 to	9.00
St. Louis, No. 1	3.50 to	4.00
St. Louis, No. 2	5.00 to	5.50

SPECIFICATION PIPE

Boston	3.00 to	4.00
Eastern Pa.	7.00 to	7.50
N. Y., deal	2.00 to	2.25

BUSHELING

Buffalo, No. 1	6.25 to	6.75
Chicago, No. 1	4.00 to	4.50
Cinn., No. 1 dl.	4.00 to	4.50
Cinn., No. 2	2.50 to	3.00
Cleve., No. 2	3.00 to	3.50
Det., No. 1 new deal.	3.25 to	3.75
St. L., No. 1	3.00 to	3.50
Val. new No. 1		8.75

MACHINE TURNINGS

Birmingham	3.00 to	3.50
Boston, dealers	0.75 to	1.00
Buffalo	3.75 to	4.25
Chicago	3.00 to	3.50
Cin., deal.	3.00 to	3.50
Cleveland	4.50 to	5.00
Detroit	1.50 to	2.00
Eastern Pa.	3.00 to	3.50
N. Y., deal	1.35 to	1.50
Pittsburgh	5.75 to	6.25
St. Louis	1.50 to	2.00
Valleys	6.50 to	7.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	.75 to	.90
Buffalo	3.75 to	4.25
Cinn., deal.	3.00 to	3.50
Cleveland	4.50 to	5.00
Detroit, deal	1.75 to	2.25
Eastern Pa.	3.50 to	3.75
N. Y., deal.	1.35 to	1.50
Pittsburgh	6.00 to	6.50

CAST IRON BORINGS

Birming., chem.	12.00 to	13.00
Birming., plain	3.00 to	3.50
Boston, chem.	5.50 to	6.00
Boston, dealers	1.00 to	1.25
Buffalo	4.25 to	4.50
Chicago	3.25 to	3.75
Cinn., deal.	3.00 to	3.50
Cleveland	4.50 to	5.00
Detroit, deal.	1.75 to	2.25
Eastern Pa.	3.50 to	3.75
E. Pa., chem.	8.00 to	10.50
N. Y., deal.	1.00 to	1.50
Pittsburgh	6.00 to	6.50
St. Louis	2.75 to	3.25

PIPE AND FLUES

Cinn., deal.	3.25 to	3.50

RAILROAD GRATE BARS

Buffalo	4.00 to	4.50
Chicago, net	5.00 to	5.50
Cincinnati	4.00 to	4.50
Eastern Pa.	5.50 to	6.00
N. Y., deal.	3.50 to	4.00
St. Louis	4.50 to	5.00

FORGE FLASHINGS

Boston, dealers	2.00 to	2.50
Buffalo	5.50 to	6.00
Cleve. ov. 10 in.	6.00 to	6.50
Detroit	3.00 to	3.50

FORGE SCRAP

Boston, dealers	1.75 to	2.00
Chicago	6.50 to	7.00
Eastern Pa., del.	5.00 to	5.50

ARCH BARS, TRANSOMS

Chicago, net	5.00 to	5.50
St. Louis	4.00 to	4.50

AXLE TURNINGS

Boston, deal.	2.50 to	3.00
Buffalo	6.50 to	7.00
Chi., elec. fce.	4.50 to	5.00
Cleveland	5.50 to	6.00
Eastern Pa., del.		7.00
Pittsburgh, O. H.	7.50 to	8.00
St. Louis	3.50 to	4.00

STEEL CAR AXLES

Birmingham	9.00 to	9.50
Boston, ship. pt.	6.00 to	6.50
Buffalo	10.00 to	10.50
Chicago, net	8.50 to	9.00
Eastern Pa.		14.50
St. Louis	9.00 to	9.50

SHAFTING

Boston, ship. pt.	7.00 to	7.50
N. Y., deal.	6.50 to	7.00
St. Louis	7.50 to	8.00
E. Penna.	11.00 to	12.00

CAR WHEELS

Birming., iron	7.00 to	7.50
Boston, iron deal.	3.50 to	4.00
Buffalo, iron	7.00 to	8.00
Buffalo, steel	8.50 to	9.00
Chicago, iron	7.00 to	7.50
Chi., rolled steel	7.00 to	7.50
Cincinnati iron	6.25 to	6.75
E. Pa. steel	8.50 to	9.00
E. Pa. iron		8.50
Pitts., iron	8.00 to	8.50
Pitts., steel	9.00 to	9.50
St. Louis, iron	5.00 to	5.50
St. Louis, steel	7.00 to	7.50

NO. 1 CAST SCRAP

Birmingham	6.50 to	7.00
Buffalo (Mach.)	10.00 to	10.25
Buffalo, cupola	9.00 to	9.50
Boston, textile	6.75 to	7.00
Boston No. 2	3.00 to	3.25
Chi., mach. net	6.00 to	6.50
Chi., railroad, net	5.25 to	5.75
Chicago, agri., net	5.25 to	5.75
Cinn., mach. cup.	7.00 to	7.50
Cleve. cupola	7.00 to	8.00
Det., net deal.	6.50 to	7.00
E. Pa. cupola	9.00 to	9.50
N. Y., cup. deal.	5.50 to	6.50
N. Y., del. local foundries	8.00 to	8.50
Pitts., cupola	8.50 to	9.00
San Fran., del.	13.50 to	14.00
Seattle	4.50 to	6.50
St. L. No. 1 ma.	6.50 to	7.00
St. L., No. 1	6.00 to	6.50

HEAVY CAST

Boston, del.	3.50 to	4.50
Bost., mach. cast	7.00 to	7.50
Buffalo, break	6.50 to	7.00
Cleve., break	5.50 to	6.00
Detroit, auto, net deal.	7.00 to	7.50
Det., break., dl.	4.00 to	4.50
Eastern Pa.		8.50
N. Y. No. 1, dl.	5.00 to	5.50
N. Y. break, dl.	4.75 to	5.25
Pittsburgh	8.00 to	8.50

MALLEABLE

Boston, consum.	8.00 to	8.50
Buffalo	8.00 to	8.50
Chicago, agri.	5.00 to	5.50
Chicago, R. R.	6.00 to	6.50
Cinci., R. R., del.	7.00 to	7.50
Cinci., agri. del.	6.50 to	7.00
Cleveland, rail	7.50 to	8.00
Det. auto deal.	5.00 to	5.50
St. Louis, rail	4.50 to	5.00

RAILS FOR ROLLING

5 feet and over

Birmingham	7.25 to	7.75
Boston, deal.	5.00 to	5.50
Buffalo	7.00 to	7.50
Chicago	8.00 to	8.50
Eastern Pa.		9.50
New York dealer	4.25 to	4.75
St. Louis	7.00 to	7.50

LOCOMOTIVE TIRES

Chicago, cut	7.00 to	7.50
St. L., No. 1	5.00 to	5.50

LOW PHOS. PUNCHINGS

Chicago	7.50 to	8.00
Buffalo	9.00 to	9.50
Eastern Pa.		8.50
Pittsburgh	10.50 to	11.00

and steel scrap is light. No. 1 melting steel for railroad shipment is easier, dealers offering $3.50 to $3.75 with little business. For barge loading No. 1 steel is unchanged, also No. 2.

Philadelphia—Further reductions have been made here on steel and iron scrap, including No. 1 heavy melting steel, which now is $6.50 on a sale of 2000 tons to a Claymont, Del., consumer. Business generally is quiet although at Johnstown, Pa., 3500 to 4000 tons of heavy steel has been bought by Bethlehem Steel Co. at $8 and $8.50, delivered. Bethlehem is buying small lots of unprepared for Bethlehem, Pa., at about $3 to $3.50, delivered. An eastern consumer has placed a modest tonnage of cast iron car wheels at $8.50, delivered.

Buffalo—Dealers continue to expect tonnage purchases of heavy melting steel but no contracts have been made. Some dealers claim tonnages will be next purchased between $6 and $7, while others have ideas much higher. The market is entirely nominal.

Pittsburgh—In 25 to 50 cent a ton reductions during the week in the iron and steel scrap market, prices on leading grades have been adjusted to a point at which orders into consumption would move if dealers were successful in overcoming iron-clad resolves of steel mills to refrain from buying. No. 1 heavy melting steel and compressed sheets thereby are quoted $8.50 to $9.00. Railroad lists of the past week are understood to have brought prices justifying the $8.50 to $9.00 range on No. 1 heavy melting steel. Blast furnace material is off 50 cents a ton.

Cleveland—Small lots of heavy melting steel are being taken on contract by melters here and some sheet scrap from automobile builders. Gray iron foundries take occasional lots of cast scrap. Other grades are inactive. Valley prices have softened and heavy melting steel has declined 25 cents.

Detroit—Heavy melting steel has declined 50 cents, compressed sheets 25 cents, and turnings, borings, new busheling and loose sheet clippings 25 to 50 cents, reflecting an extremely listless condition. Consumers generally refuse to consider any commitments until January. Offerings of scrap by automobile manufacturers will not be large in December, but they will be the heaviest in three or four months.

Cincinnati—Sales of iron and steel scrap are confined to small lots, with mills continuing the policy of taking material only on contracts in effort to cut inventories. Quotations are nominal.

St. Louis—Greater than the usual seasonal recession in iron and steel scrap activity is noted. Consumer demand is light, and with their unfilled contracts about exhausted, dealers are purchasing only a few scattered lots. Quotably prices remain stationary, but on most items are purely nominal, there having been no trades on which to predicate actual values.

Toronto, Ont.—Demand for iron and steel scrap is specialized. Local dealers have no call for steel scrap, although there is some demand in the Montreal area for heavy melting steel. Turnings are at a standstill. Sales are reported in machinery cast, which has been the feature of the market for several months. Stove plate and malleable grades are moving slowly, and most other lines are dull. Dealers have made no revision in prices, but are paying slightly above list for cast scrap.

Birmingham, Ala.—Steel and iron scrap is inactive. Prices are weak and supplies are ample.

Plan New Materials Exhibit

The National Alliance of Art and Industry, 65 East Fifty-sixth street, New York, will stage an exhibition entitled "New Materials, New Products and New Uses" in the Art Center building, New York, from Jan. 16 to Feb. 15. Exhibits will include new uses for metal alloys, new developments in lighting, heating and ventilating equipment, new materials in the building industry and developments in the motor, airplane and electrical industries.

Equipment

Seasonal Slowness Further Depresses Dull Market

New York — For a maintenance shop, central heating plant, Washington, a small list of machine tools will be required including a drill and lathe. There has been some gain in the demand from government shops, a good sized list closing Dec. 20, covering tools for many points. Other than this type of work, demand for equipment is light, there being little inquiry to be figured. Rehabilitation programs have resulted in a few sales of equipment.

Worcester, Mass.—A list of machines for the Portsmouth, N. H., navy yard, closing Dec. 20, is the best inquiry in the New England territory. Included are several turret lathes, a number of automatic screw machines, a plain brass finishing lathe, drill and tapper and universal bar and chucking turret lathe. General inquiry is light and sales are confined to individual units as a rule.

Cleveland—Sales of machinery and equipment hold at a low level, making this month one of the poorest of the year with some dealers. Inquiry in some cases is active but the desire to postpone commitments is met continually. Used machinery often is being purchased where normally new equipment would be bought.

Pittsburgh—Marked quiet provides little of note to the steel mill equipment market. Equipment makers find extreme difficulty not only in interesting prospective customers but also in obtaining their permission to release old business. After a fair month in shipments during November, ingot mold demand has fallen off to a point indicating December will be near the slowest month of the year. Small machines and machine tools lack a market with prospective work of such discouraging characteristics that no immediate upturn is promised.

Chicago—The market for machine tools and plant equipment is affected to a certain extent by seasonal influences, although occasional sales are reported. Inquiry holds to its recent volume. While orders from railroads are extremely light and few inquiries are appearing, one road is expected to close shortly on three lathes and one shaper. Purchase of additional tools is likely to be deferred. Bids have been taken on about 12 machine tools for the Cincinnati union terminal. This included used as well as new equipment, and bids also were invited from railroads using the Cincinnati terminal facilities on used equipment they might desire to dispose of. Small miscellaneous manufacturers are showing additional interest in improving plant facilities, but in most cases orders are deferred. Steel companies generally are out of the market for the commoner types of machine tools, while little additional business is in prospect from farm implement manufacturers.

Nonferrous Mill Products

Base price cents per pound f.o.b. mill except otherwise specified. Copper and brass product prices based on 6.25c, Conn., for copper

SHEETS	
Yellow brass (high)	12.50
Copper, hot rolled	15.37½
Lead sheets, cut, to jobbers	7.00
Zinc sheets (100-lb. base)	9.00
TUBES AND PIPES	
Seamless yellow brass (high)	15.25
Seamless copper	14.37½
RODS	
Yellow brass (high, full turning)	10.25
Naval brass	11.37½
ANODES	
Copper, untrimmed	12.25
WIRE	
Yellow brass (high)	12.50

Old Metals

Dealers' buying prices, cents lb. No. 1 Composition Red Brass

New York	2.62½ to 2.75
Chicago	2.25 to 2.50
Cleveland	2.50 to 2.75
St. Louis	2.50
HEAVY YELLOW BRASS	
New York	1.87½ to 2.00
HEAVY COPPER AND WIRE	
New York	3.50 to 3.75
Chicago, No. 1	3.12½ to 3.37½
Cleveland	2.75 to 3.00
St. Louis	2.75
COMPOSITION BRASS BORINGS	
New York	2.37½ to 2.50
YELLOW BRASS TUBING	
Cleveland	1.50 to 2.00
LIGHT COPPER	
New York	2.62½ to 2.75
Chicago	2.25 to 2.50
Cleveland	2.25 to 2.50
St. Louis	2.50
LIGHT BRASS	
Chicago	1.12½ to 1.37½
Cleveland	1.00 to 1.25
St. Louis	1.50
LEAD	
New York	2.00 to 2.25
Cleveland	1.75 to 2.00
St. Louis	2.00
ZINC	
New York	1.12½ to 1.25
Cleveland	1.00 to 1.12½
St. Louis	1.25
ALUMINUM	
Clippings, new, soft, Cleve.	9.50 to 10.00
Clippings, hard, Cleveland	6.50 to 7.00
Borings, Cleveland	3.00 to 3.50
Mixed cast, Cleveland	4.00 to 5.00
Mixed cast, St. Louis	3.75 to 4.00

Secondary Metals

Remelt aluminum No. 12	8.00 to 9.00
Brass ingot, 85-5-5-5	5.50

Metals

Copper Declines to New Low of 5.00c, Connecticut—Lead and Zinc Quiet—Tin Nominal

New York—The metals were quiet last week with prices tending somewhat toward easiness. Copper fell to a new all-time low of 5.00c, Connecticut, as did bar silver. Tin was largely nominal and eased as the week closed. Unsettling factors in the market included the apparent failure of the world conference on copper, uncertainty over war debt negotiations and the reluctance of consumers to add to inventories at this time.

Copper—Electrolytic metal was available from custom smelters during the latter part of the week at the record low of 5.00c, Connecticut, for prompt delivery. For first quarter shipment 5.12½c generally applied and for second quarter 5.25c. Mine producers generally held to the entirely nominal quotation of 6.25c but it was indicated that some would take business at 5.50c. However, consumers were little interested at any price. Old metals and brass ingot eased with the decline in virgin metal but copper and brass products continued on the basis of 6.25c metal. The world conference on curtailment of production and foreign marketing arrangements apparently came to an end Friday with the sailing of representatives of important African producers for Europe. The firm stand of Roan Antelope Copper Mines Ltd. for an increase production quota resulted in the conference ending in a deadlock. This company can show a profit on copper even at present prices.

Lead—The midwestern market definitely settled to 2.87½c, East St. Louis, when the leading producer cut its asking price to this level. The New York quotation remained at 3.00c, however. Demand was slightly better but still relatively inactive.

Antimony—Prices were somewhat lower but demand failed to pick up.

Zinc—Most producers were willing to sell prime western metal at 3.19½c, East St. Louis, for delivery through January but little test of the market developed.

Tin—Prices were largely nominal due to slow demand and were governed mostly by the fluctuations in sterling exchange and the London market.

Aluminum—Quietness continued in the market with prices unchanged.

Silver—Commercial bars dropped to a new low of 24.87½c an ounce Dec. 3 but were quoted ½-cent higher Friday.

Sulphate Price Up

New York—Sulphate of ammonia is up 50 cents a ton, port, to $22, with not much change in demand. Distillate prices are being reaffirmed for first quarter. A slight gain in contracting for naphthalene is noted. Phenol business is routine at unchanged prices.

Coke By-Products

Per Gallon, Producers' Plants, Tank Lots

	Spot
Pure benzol	$0.20
90 per cent benzol	0.20
Toluol	0.30
Solvent naphtha	0.26
Commercial xylol	0.26
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.153 to 0.173
Per Pound at Producers' Plants	
Naphthalene flakes	4.75 to 5.75
Naphthalene balls	4.75 to 5.75
Per 100 Pounds Atlantic Seaboard	
Sulphate of ammonia	$1.10

Quicksilver Is Steady

New York—Quicksilver prices are unchanged, with small lots $49, a virgin flask of 76 pounds, and round lots $48. Demand is quiet.

Nonferrous Metal Prices of the Week, Cents a Pound

Spot unless otherwise specified

	Copper Electro., del. Conn.	Copper Lake, del. Midwest	Copper Casting refinery	Straits Tin New York Spot	Straits Tin New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 98-99% Spot, N. Y.	Antimony Ingot	Nickel
Dec. 3	5.12½	5.37½	4.87½	22.37½	22.60	3.00	2.87½	3.12½	22.90	5.50	35.00
Dec. 5	5.12½	5.37½	4.87½	22.50	22.72½	3.00	2.87½	3.12½	22.90	5.50	35.00
Dec. 6	5.12½	5.37½	4.87½	22.55	22.70	3.00	2.87½	3.12½	22.90	5.50	35.00
Dec. 7	5.00	5.37½	4.75	22.75	22.90	3.00	2.87½	3.12½	22.90	5.40	35.00
Dec. 8	5.00	5.37½	4.75	22.65	22.80	3.00	2.87½	3.12½	22.90	5.40	35.00
Dec. 9	5.00	5.37½	4.75	22.50	22.65	3.00	2.87½	3.12½	22.90	5.40	35.00

Pacific Coast

First Bids Called for Part of San Francisco-Oakland Bridge —Other Steel Tonnages Small —Public Projects Continue to Furnish Nearly All Activity— Seattle Sees Better Feeling

San Francisc. —(*By Air Mail*)— The call for bids for the first part of the San Francisco-Oakland bay bridge was issued this week and bids will be opened Feb. 2 for Contract No. 2, which includes the substructure of the West-Bay crossing, piers 2 to 6. Structural steel totals 150 tons and reinforcing bars 1900 tons. Bids were opened Nov. 29 for construction of the 13-mile San Jacinto tunnel of the Colorado aqueduct project for the Metropolitan water district of Southern California. The Metropolitan Engineering Co., Los Angeles, submitted the low bid of $7,333,315. Ten proposals were offered, the highest being $13,000,000. This portion of the work calls for 250 tons of steel tunnel structure. 125 tons each of shapes and reinforcing bars.

Awards of reinforcing bars were confined to lots of less than 100 tons. Bids will be opened Dec. 20 for approximately 500 tons for buildings at Fort Miley, Calif. Bids open Dec. 21 for 226 tons for highway work in Alameda county, California. Bids were opened on 122 tons for highway work in Ventura county, Calif. Out-of-stock prices in the San Francisco and Los Angeles district hold at 2.40c, base, on carload lots. Merchant bar steel is quoted at 2.10c, c.i.f., and movement is restricted to small lots.

Western Pipe & Steel Co. secured 100 tons of plates for two oil storage tanks for the Associate Oil Co. at Avon, Calif. Pelton Water Wheel Co. booked 100 tons for valves and sluice gates for San Gabriel dam No. 2 Los Angeles county. Prices are general at 2.00c, c.i.f.

Consolidated Steel Corp. booked 300 tons for a mixing plant at Boulder City, Nev., for the Six Companies. Virginia Bridge & Iron Co. secured 200 tons for a bridge at Gaviotta, Calif., for the Southern Pacific Co. Bids open on Dec. 20 for 1000 tons for buildings at Fort Miley, Calif.

Inquiries Are Better

Seattle—Although the approach of inventories and a general disposition to postpone buying until next year are unfavorable factors, sentiment is improving and there is a slight increase in inquiries. Larger tonnages are pending and several important contracts, involving iron and steel, are up for awards during the month.

Superintendent United States Indian irrigation service, District 2, Wapato, Wash., received bids Dec. 8 for two plate steel penstocks and 3223 feet of steel discharge pipe, totaling 400 tons of steel. Berg Shipbuilding Co. Seattle is low bidder at $228,480 for constructing the lighthouse tender, HEMLOCK, for Alaska service, about 400 tons of steel, half plates and half shapes. Puget Construction Co., Seattle, is low at $181,345 for the Bonner's Ferry, Idaho, state bridge, requiring 165 tons of reinforcing and 700 tons of structurals. Washington will open bids Dec. 20 for a 265-foot concrete bridge over the Klickitan river, involving an unstated tonnage of concrete bars. Subcontracts for furnishing 125 tons of sheet steel piling and liner plate for a tunnel at Puget Sound navy yard are still pending.

Steel in Europe

World Uncertainties Delay Progress—Some Gains

London — (*By Radio*) — International events which cause uncertainty in business are holding back progress, which had made a good start. The Middlesbrough district reports expanding business, some for forward delivery, and output is heavier. The scrap iron and steel market is strong as a result of heavy foreign sales. The Midlands are now nearly free of Continental competition. General engineering demand continues dull. Galvanized sheets are slow.

The Continent reports trade is quieter, owing to sterling fluctuations and the approach of the year end. Prices show weakness. Belgium reports competition from Dutch pig iron.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Dec. 8

Export Prices f.o.b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports		Continental Channel or North Sea ports, metric tons Gold parity, $4.8665	
PIG IRON	£ s d		£ s d	
Foundry, 2.50-3.00 Silicon	$ 9.45	2 18 6	$8.27	1 14 0
Basic bessemer	8.72	2 14 0*	6.81	1 8 0
Hematite, Phos. .03-.05	9.53	2 19 0	.....	.....
SEMIFINISHED STEEL				
Billets	$15.75	4 17 6	$10.22	2 2 0
Wire rods, No. 5 gage	24.23	7 10 0	21.90	4 10 0
FINISHED STEEL				
Standard rails	$25.03	7 15 0	$26.77	5 10 0
Merchant bars	.90c	6 5 0	.63c	2 17 0
Structural shapes	1.06c	7 7 6	.50c to .51c	2 5 0 to 2 6 0
Plates, †¼ in. or 5 mm	1.26c	8 15 0	.72c to .73c	3 5 0 to 3 6 0
Sheets, black, 24 gage or 0.5 mm.	1.19c	8 5 0	1.29c	5 17 6
Sheets, gal., 24 gage, corr.	1.44c	10 0 0	1.43c	6 10 0
Bands and strips	1.12c	7 15 0	.77c to .80c	3 10 0 to 3 12 6
Plain wire, base	1.37c	9 10 0	1.18c	5 7 6
Galvanized wire, base	1.66c	11 10 0	1.38c to 1.40c	6 5 6 to 6 7 6
Wire nails, base	1.58c	11 0 0	1.21c	5 10 0
Tin plate, box 108 lbs.	$ 2.58	0 16 0	$3.20	0 13 2

British forromanganese $68 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

		£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$ 9.45	2 18 6	$ 8.02	205(2)	$ 8.31	300	$16.42	69
Basic bessemer pig iron	8.72	2 14 0*	6.65	170(1)	7.48	270	17.97	75.50
Furnace coke	1.94	0 12 0	4.85	124	3.05	110	4.57	19.20
Billets	16.15	5 0 0	14.47	370	10.94	395	2.97	96.50
Standard rails	1.19c	8 5 0	1.25c	697	1.50c	1,150	1.37c	127
Merchant bars	.97c	6 15 0	.95c	530	.71c	545	1.19c	110
Structural shapes	1.26c	8 15 0	.99c	550	.65c	500	1.16c	107.50
Plates, †¼-in. or 5 mm	1.30c	9 0 0	1.17c	650	.81c	625	1.37c	127
Sheets, black	1.33c	9 5 0‡	1.44c	800‡	.91c	700‡	1.56c	144
Sheets, galv., corr., 24 ga. or 0.5 mm	1.62c	11 5 0	2.83c	1,570	1.87c	1,440	4.00c	370
Plain wire	1.37c	9 10 0	2.03c	1,130	1.69c	1,300	1.92c	178
Bands and strips	1.37c	9 10 0	1.02c	565	.88c	675	1.37c	127

*Basic. †British ship-plates, Continental, bridge plates. ‡24 ga. ‡1 to 3 mm. basic price.
British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel.

STEEL, WROUGHT AND CAST IRON PIPE, AND TUBING

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pittsburgh and Lorain, O., to consumers in carloads. Indiana Harbor, Ind., and Evanston, Ill., 2 points less. Chicago delivered, 2½ points less. Wrought pipe, Pittsburgh base. Base is $200 per ton.

BUTT WELD

	Steel			Iron	
In.	Blk.	Gal.	In.	Blk.	Gal.
¼ & ⅜	57	34	½	28	10½
½	62	49½	¾	33	16½
¾	65½	55	1—1¼	36	20½
1—3	67½	57	2	38	21

LAP WELD

2	61	50½	2	26	12½
2½ to 6	64½	54	2½—3½	33	18½
8	62	51	4—6	35	22
10	60	49	7—8	34	21½
12	59	48	9—12	31	16½

BUTT WELD

Extra strong, plain ends

⅛	48	33	¼ & ⅜	+7	+41
¼ & ⅜	53½	38½	½	28	12½
½	59	49½	¾	33	17½
¾	63½	54	1—2	39	23

LAP WELD

Extra strong, plain ends

2	59	49½	2	34	18½
2½ to 4	62½	53	2½—4	39	25
5 & 6	62	52½	4½—6	38	24
8	58	47	7 & 8	36	22
10	51½	40½	9—12	26	13½
12	50½	39½			

STEEL LINE PIPE

2 to 3 butt ....66½ 2½ to 6 lap....63½
2 lap .....60 8 lap 61
10 lap .....59 12 lap 58

Discounts on steel pipe are net and not subject to any point or preferential. On iron pipe, the discounts shown on the cards are net, and are not subject to any further discounts or preferentials.

BOILER TUBES

Carload discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2—2¼	38	1¾	8
2½—2¾	46	2—2¼	13
3	52	2½—2¾	16
3¼—3¾	54	3	17
4	57	3¾—3½	18
4½—6	46	4	20
1½	1	4½	21

On lots of a carload or more, above base discounts subject to preferential of two 5 per cent discounts on steel and 10 per cent on charcoal iron. Smaller quantities subject to following modifications from base discounts.

Lap Welded Steel—Under 10,000 pounds, 6 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and two 5 per cents. Charcoal Iron—under 10,000 pounds, 2 points under base; on 10,000 pounds to carload, base and one 5%.

STANDARD COMMERCIAL SEAMLESS BOILER TUBES COLD DRAWN

1 inch	61	3	46
1¼—1½	53	3¼—3½	48
1¾	37	4	51
2—2¼	32	4½, 5, 6	40
2½—2¾	40		

HOT ROLLED

2—2¼	38	3¼—3½	54
2½—2¾	46	4	57
3	52	4½ 5, 6	46

Quantity discounts are: Under 10,000 pounds, 10 points and 5 per cent; 10,000 to 24,999 pounds, 6 points and 5 per cent; 25,000 pounds to carload, 2 points and 5 and 5 per cent; carload and over, base discount and 5 and 5 per cent. No extra for lengths up to and including 24 feet. Sizes smaller than 1 inch and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Tubing

Cold drawn; f.o.b. mill discounts

Random lengths over 5 ft. 55%
Selected lengths, 1—18 ft. 53%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

Six-inch and over, Bir. ....$32.00 to 33.00
Four-inch, Birmingham .... 36.00 to 37.00
Four-inch, Chicago ..... 43.40 to 44.40
Six to 24-inch, Chicago..... 40.40 to 41.40
Six-inch and over, N. Y... 32.00 to 34.50
Four-inch, New York ..... 34.50 to 36.50
Stand. fittings, Bir. base.... $100.00

Six to 24-inch, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch plus $20; gas pipe fittings, $5 higher Class A pipe $4 higher than Class B

Warehouse Quotations at Leading Centers, in Cents Per Pound

(All Philadelphia prices subject to quantity differentials except reinforcing and Swedish bars)

STEEL BARS

Baltimore*	2.35c
Boston††	2.90c
Buffalo	2.95c
Chattanooga..	3.00c
Chicago	2.75c
Cincinnati	3.00c
Cleveland	2.75c
Detroit	2.85c
Houston	2.65c
Los. Ang.	3.30c
New York‡(d)	3.10c
Philadelphia..	2.45c
Pittsburgh	2.60c
Portland	3.35c
San Fran.	3.15c
Seattle	3.00c
St. Louis	3.00c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS

Baltimore	2.35c
Boston††	3.10c
Buffalo	3.15c
Chattanooga..	3.00c
Chicago	2.75c
Cincinnati	3.00c
Detroit	2.85c
New York‡(d)	3.10c
Philadelphia..	2.45c
St. Louis	3.00c
Tulsa	3.25c

REINFORC. BARS

Baltimore 2.35c-	3.00c
Boston 3.10c-	3.25c
Buffalo	2.95c
Chattanooga..	3.00c
Cincinnati	3.00c
Cleveland 2.10-	2.25c
Detroit	2.85c
Houston	3.00c
Los. Ang. cl...	2.10c
Los Ang., lcl	2.40c
New York... 2.65c-	3.10c
Phila. 2.62½c	
Pittsburgh	2.60c
San Fran. cl.	2.40c
San Fran. lcl	2.80c
Seattle	3.00c
St Louis	3.15c
Tulsa	3.25c
Young. 2.30c-	2.60c

SHAPES

Baltimore*	2.35c
Boston††	3.00c
Buffalo	3.20c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland	2.95c
Detroit	3.10c
Houston	3.25c
Los. Ang.	3.30c
New York(d)	3.10c
Philadelphia.	2.45c
Pittsburgh ...	2.85c
Portland	3.35c
San Fran.	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.25c
Tulsa	3.50c

PLATES

Baltimore*	2.35c
Boston††	3.00c
Buffalo	3.20c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati ...	3.25c
Cleveland, ¼-in. and thicker	2.95c
Clev., 3/16-in.	3.20c
Detroit	3.10c
Det., 3/16-in	3.10c
Houston	3.00c
Los Angeles.	3.30c
New York(d)	3.30c
Philadelphia.	2.45c
Phila. floor...	5.10c
Pittsburgh ...	2.85c
Portland	3.35c
San Fran.	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE

Baltimore*	2.80c
Boston†† 2.90c-	3.00c
Buffalo	3.45c
Chattanooga	3.50c
Chicago 2.75c-	2.90c
Cincinnati	3.30c
Cleveland	3.00c
Detroit	3.35c
Houston	3.35c
Los Ang.	3.60c
N. Y.	3.00c
Portland	4.00c
Phila.*† (e)....	2.90c
Pitts.**	3.00c
San Fran.	3.50c
Seattle	4.00c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK

Balt.*†	3.50c
Boston††	3.85c
Buffalo	3.70c
Chattanooga..	3.65c
Chicago	3.45c
Cincinnati	3.75c
Cleveland	3.25c
Detroit	3.50c
Los Ang.	4.20c
New York ..3.75c-	4.00c
Phila.*†(e) ..	3.40c
Pitts.**	3.40c
Portland	4.50c
San Fran.	3.90c
Seattle	4.50c
St. Louis	3.80c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS

Balt.*†	4.00c
Boston††	4.00c
Buffalo	4.05c
Chattanooga.	3.95c
Chicago 3.50c-	3.75c

††Base 15,000 lbs., extras on less.

Cincinnati ..	4.25c
Cleveland ...	
Detroit	3.75c
Houston	4.25c
Los. Ang.	4.50c
New York....4.00c-	4.10c
Phila.*†(e)	3.75c
Pitts.**	3.90c
Portland	5.00c
San. Fran.	4.55c
Seattle	5.00c
St. Louis	4.35c
St. Paul	4.19c
Tulsa	5.10c

†BANDS

Baltimore	2.65c
Boston††	3.40c
Buffalo	3.30c
Chattanooga.	3.20c
Chicago	2.95c
Cincinnati	3.20c
Cleveland	3.00c
Det. 3/16-in. & lighter....	3.15c
Houston	3.65c
Los Ang.	3.80c
New York(d)	3.30c
Philadelphia.	2.75c
Pittsburgh	2.95c
Portland	3.85c
San Fran.	3.15c
Seattle	3.50c
St. Paul	3.20c
Tulsa	3.45c

†HOOPS

Baltimore	2.65c
Boston	4.90c
Buffalo	3.95c
Chicago	3.50c
Cincinnati	3.75c
Det. No. 14 & lighter....	3.30c
New York	3.30c
Philadelphia	3.00c
Pittsburgh	3.60c
Seattle	5.00c
St. Paul	3.75c

†New extras apply.

COLD FIN. STEEL

Rounds & Hexagons

Baltimore (c)*	3.48c
Boston	3.60c
Buffalo	3.00c
Chattanooga*	3.65c
Chicago	3.00c
Cincinnati	3.32c
Cleveland	2.95c
Detroit	3.15c
Los Ang. (a)	4.25c
New York	3.39c
Philadelphia*	3.35c
Pittsburgh	2.95c
Portland (a)	4.50c
San Fran. (d)(f)	5.55c
Seattle (a)....	4.50c
St. Paul (a)..	3.20c
St. Louis	3.36c
Tulsa	4.65c

Flats and squares 50c extra, except Tulsa, where 5.14c is quoted

COLD ROLL. STRIP

Boston 0.100 in., 500 lb. lots	5.20c
Buffalo	5.25c
Chicago (b)...	5.65c
Cincinnati	5.80c
Cleve. (b)	5.55-
Detroit	5.40c
Phila. (c).....	4.55c
New York	4.55c

(a) Rounds, hex. only.
(b) Net base straightening, cutting, boxing 1 ton or more.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
(e) New mill classif.
(f) Rounds only.
‡Domestic bars.
*Plus quan. extras.
**Less than 25 sheets
*†50 or more bundles

Technical Progress in Iron, Steel Outruns Depression

(*Continued from Page 26*)

about one half what is considered the normal rate. Figures were shown which disclosed the substantial reduction of losses that can be accomplished if gas velocities through the furnace are kept at a minimum.

Adverse results of slow blowing are higher costs and higher fixed charges which are directly proportional to tonnage. But even at a 50 per cent rate, the net effect in many cases has been a final cost which is as low or even lower than so-called normal operating cost. The report pointed out also that intermittent operation, while not so productive of economies as slow blowing, has furnished some surprising upsets to previously accepted theories.

Some beneficial experiences in the use of scrap were noted and an increasing interest in the more profitable use of blast furnace gas. For the conservation of gas and the attainment of higher blast furnace temperatures, the year has been marked by the introduction of additional types of stove checkers. There also have been some new developments in the design of slag and hot metal handling equipment, noteworthy among the latter it is said, being ladles of all rolled and welded steel construction.

A new type of dust catcher, embodying a zeppelin or streamline principle for more equal distribution of gas and prevention of turbulence has been built; and double compartment bosh and stack plates, applying the advantages of double-compartment tuyeres to the cooling of furnace walls have been placed on the market. Demand for cheap forms of insulation has revived the manufacture of slag wool.

Advantages in Small Plant

The small open-hearth plant has been showing up to particular advantage during the depression, compared with the large units, it was reported—even where methods have been comparatively crude and where there have not been any of the more modern appurtenances of operation. Unfortunately, so the report points out, most of the steel companies which went forward with substantial research programs following the beginning of the current depression, severely curtailed or entirely omitted these programs since the first of the year. However, some important research projects are going ahead in some quarters. One has to do with the firing of the furnace through the roof. Another involves the firing of the furnace from four points. Manufacturers of refractories have made marked improvements in their prod-

EMPIRE STEEL SHEETS

EMPIRE STEEL SHEETS

ELECTRICAL
All Grades
•
AUTO BODY
•
COLD ROLLED
•
HOT ROLLED
PICKLED
•
HOT ROLLED
ANNEALED
•
TIN MILL BLACK
All Grades
•
WABIK METAL
VITREOUS
ENAMELING
•

Scientific supervision and distinctive methods in the production of Empire Steel Sheets, assure consistent uniformity and constant adherence to your most exacting requirements.

EMPIRE STEEL CORPORATION
MANSFIELD
OHIO

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uct, with a resultant bearing on open-hearth operations.

Completion of a number of large mill installations and several distinctly new developments mark the year's progress in rolling mills. The report described briefly several of the more important installations. Discussing the progress in the manufacture of electric weld pipe, the report stated that there has been sufficient advancement to insure definitely that the electric weld method of pressure pipe manufacture is here to stay and that in all probability it will decidedly improve its position in the near future.

In considering recent progress in the field of refractories, attention was drawn to the number of types of brick developed and to modifications made in existing types in order to meet certain definite service requirements. Included in these are high-alumina brick, modifications in chrome and magnesite brick, kaolin brick and such special refractories as silicon carbide and fused alumina.

While declaring that welded structures cannot in every case replace castings with economic or engineering advantage, the society's report on machine shop practice stated that with the availability of present-day knowledge welded designs are coming into vastly increased usage. The report also pointed to more efficient machine tools and cutting elements, and to a rapid improvement in the quality of work turned out by up-to-date forging machinery.

An outstanding achievement of the past year has been the provision of automatic loading devices for individual machines or groups. This, it was said, was particularly notable when it is realized that the average machine tool is actually cutting metal only about 30 per cent of the total working hours.

Fundamental Research Needed Into Laws Governing Creep of Metals

NEED for more fundamental study of laws governing creep rather than creep tests of many different materials was stressed by P. G. McVetty, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., who discussed factors affecting choice of working stresses for high temperature service. Due to the urgent need in the selection of working stresses to be used in present designs, it is impossible to wait for further tests, the speaker declared. Industry has but to consider the advances in design of the past ten years to be convinced that there is real value in the data already available. He submitted a few precautions to serve as a guide toward rational conclusions in attempts to summarize and correlate existing data.

In a discussion of Mr. McVetty's paper, F. N. Speller, National Tube Co., New York, declared that a more fundamental research on the factors affecting the creep values of metals at high temperatures was particularly necessary in connection with the changes that occur in the properties of steel at elevated temperatures with time. In this connection, he said, it is important to know how to put the steel in the most stable condition in a relatively short time, so that no material change affecting the physical properties will occur during the period of the creep test, or the life of the metal in service.

In his paper on the applications of creep tests, Gleason H. MacCullough, professor of engineering mechanics, Worcester Polytechnic institute, Worcester, Mass., presented four specific problems for which solutions have been presented, namely: The problem of the flanged and bolted pipe joint under creep conditions, and the three problems of stress distribution and creep in thick-walled cylinders under internal pressure, in a beam subjected to pure bending, and in a solid circular shaft under torsion. Prof. MacCullough presented these solutions as an illustration of the type of creep data the designer is anxious to obtain.

Stresses Temperature Factor

In discussion of Mr. MacCullough's paper, Mr. McVetty emphasized as of great importance the relation to the temperature which is assumed to represent service conditions. Experiment shows, he said, that the creep rate is particularly sensitive to temperature changes. If, for example, the temperature rises to 875 degrees Fahr., when a value for 850 degrees Fahr. has been assumed, the experimenter may expect an increase in the creep rate of as much as six to one. This should be kept in mind in any application of creep data so that sufficient allowance be made for possible temperature fluctuations. On this account, he said, designs are usually based on maximum rather than average temperatures.

Ernest L. Robinson, turbine engineering department, General Electric Co., Schenectady, N. Y., in his discussion of metals at high temperature, stated that tests on the flow of metals at high temperature under stresses so small that the resulting distortions are less than 0.1 per cent show, throughout the duration of experiments extending into the second year, continued reductions in rates of flow, so that, for such small distortions, it is impossible to associate any particular rate of flow with a corresponding allowable stress. The speaker remarked that a statement of test results, to be of use, requires in addition to rate of flow and applied stress, a record of total extension and possibly also a record of time elapsed. Further tests should be made under conditions of stress approximating the conditions of application in actual service.

In discussion of certain features of Mr. Robinson's paper, R. S. Puffer, General Electric Co., West Lynn, Mass., pointed out that there are applications involving high stresses and temperatures, where a life of 1000 to 2000 hours, or even less, is acceptable, but where the conditions of temperature and stress or even the rate of plastic deformation are either unknown or exceedingly hard to determine. Such conditions, he said, are encountered in the internal combustion field, and more particularly in supercharging of aircraft engines by means of exhaust turbines.

Explains Fatigue Failures

H. F. Moore, research professor of engineering materials, University of Illinois, Urbana, Ill., declared in his paper on the fatigue of metals, that the essential feature of this fatigue is a spreading crack which frequently starts by slip along the planes of atomic weakness. Study of fatigue failure, Prof. Moore asserted, has shown certain limitations of the mathematical theory of elasticity when applied to actual non-homogeneous metals.

Stress-concentration phenomena in fatigue of metals were discussed in a paper by R. E. Peterson, manager, mechanics division, Westinghouse Research Laboratories, East Pittsburgh, Pa. He presented a brief review of available data on the effect of holes, fillets, grooves, etc. on endurance strength and made some observations concerning fatigue fractures.

Working stresses for columns and thin-walled structures were discussed by S. Timoshenko, professor of mechanical engineering, University of Michigan, Ann Arbor, Mich. He declared that slender bars, thin webs and thin-walled tubular members are often used in such metallic structures as airplanes, ships, bridges, etc., and that in choosing working stresses for such structural elements not only mechanical problems of the material but the elastic stability of these elements should be considered.

Construction and Enterprise

CONCISE, TIMELY BUSINESS BUILDING OPPORTUNITIES IN FIELD OF INDUSTRY

New England

BRIDGEPORT, CONN.—Baird Machine Co. has plans for two 1-story additions to its plant at Stratford, Conn., 33 x 100 feet and 100 x 100 feet.

BOSTON — Sanford Manufacturers Inc. has been incorporated to manufacture hardware, by Paul A. Draper and E. V. Hickey, 66 Fountain street, West Newton, Mass.

BOSTON—Edison Electric Illuminating Co. has completed installation of nearly two miles of underground steam construction to be fed live steam from the Kneeland street generating plant, supplying a new area containing several large users.

BOSTON—B. F. Sturtevant Co., Hyde Park, Boston, has bought control of the Cooling & Air Conditioning Co., New York, and will reincorporate as Sturtevant Cooling & Air Conditioning Co., with headquarters at Hyde Park.

BOSTON — East Boston Brass Foundry has started operations at 155 Border street, East Boston, Mass., operating a job casting shop. The company occupies a story and a half building containing about 4000 square feet of floor space. Harry F. Russell is president.

BOSTON — Andrews & Goodrich Inc., manufacturer of drying and ventilating equipment for industrial uses, has bought the plant formerly occupied by D. Eddy & Sons, 1336 Adams street, Dorchester, Mass., and has removed its manufacturing headquarters from 171 Sidney street, Cambridge, Mass., to this plant. Larger space is available and output will be expanded. Charles F. Goodrich is president and D. R. Andrews treasurer.

LYNN, MASS.—Glen Products Co. has started manufacturing operations at 3 Glen avenue, Lynn, Mass. Its product is a special lawn mower sharpener, variable speed drive equipment and it conducts also a jobbing machine shop. Charles H. Kershaw is proprietor.

LYNN, MASS.—Liberty Cutting Die Co. has started the manufacture of shoe-cutting dies at 5 Suffolk court, Lynn, Mass. The plant contains about 2000 square feet of floor space. The company is composed of Joseph Magiacono, Harry Lesiuk and Harry Dirnament.

NEWTON, MASS.—Newton Iron Works has started business at 304 Washington street, Newton Corners, Mass., making wrought iron hardware and grill work. Leon Avakian is proprietor.

New York

BUFFALO — Washington Iron Works suffered loss of about $5000 by fire in its plant early in December.

BROOKLYN, N. Y.—Callahan Can Machine Co. has been incorporated with $20,000 capital to manufacture machinery, boilers and engines, by Latson & Tamblyn, 37 Wall street, New York.

BROOKLYN, N. Y.—Nelson Brothers Metal Ornaments Inc. has been incorporated to manufacture metal goods, by Benjamin Nelson, 464 East Ninety-sixth street, and L. Nelson, 58 East Fifty-second street, Brooklyn, N. Y.

NEW YORK—Excelsior Novelty Casting Co. has been incorporated with $10,000 capital to operate a foundry, by M. Friedman, 478 East Tremont avenue, New York.

New Jersey

NEWARK, N. J.—Reliable Machine Screw Co., 128 Sussex avenue, has taken a contract for 500,000 parts for a patent can opener. Fred B. Williamson, president, expects ten weeks will be needed to fill the order. An order for 100,000 salt shaker plungers is expected to close shortly.

Pennsylvania

BOLIVAR, PA.—Allegany Refiners Inc. plans construction of a refinery here with daily capacity of 1500 barrels, to cost about $300,000.

PITTSBURGH—South Hills Ornamental Iron & Wire Works Co. has been incorporated with $30,000 capital to manufacture fire escapes, railings and other iron products, by Pascal N. Dell'Accio, 240 Sycamore street, Pittsburgh.

PITTSBURGH—Hillman Coal & Coke Co., Pittsburgh, has filed application with the government for permission to rebuild a river coal tipple at Brownsville, Pa. It also asks permission to drive piling and construct crib work at its Pike mine.

Ohio

BELLEFONTAINE, O.—L. J. Zerbee of Zerbee Mfg. Co., has bought the plant of the former Fisher Brass Co. and will occupy it for the manufacture of ornamental bronze and iron.

CLEVELAND—Motor Valve Products Corp. has been incorporated with 250 shares no par value to manufacture motor parts, by J. H. Smart, 308 Euclid avenue, Cleveland, and associates.

COLUMBUS, O. — Atlas Brass Foundry, 991 South Front street, was damaged by fire about $2500. J. P. Salter is manager.

DAYTON, O.—Schriber Sheet Metal & Roofers Inc. has been incorporated with 100 shares no par value to do sheet metal fabrication, by I. L. Jacobson, 1005 Third National Bank building, Toledo, O.

Michigan

ALBION, MICH.—Plans have been completed for an addition to the factory building of the Russel Furnace Co., Albion, Mich.

DETROIT—M. K. Mackensen Roofing Co. Inc., 14690 Livernois avenue, has been incorporated with $5000 capital to manufacture and fabricate street metal work, by M. K. Mackensen, 14676 Stoepel avenue, Detroit.

DETROIT—Zerricon Corp., 748 Buhl building, has been incorporated with 50,000 shares no par value to manufacture metals and alloys, by I. Joseph Farley, 1301 Bishop road, Grosse Pointe, Mich.

FRANKFORT, MICH. — Village council has engaged Francis Engineering Co., Saginaw, Mich., to make a survey on possibilities of the village building a municipal electric light and power plant. (Noted Nov. 21.)

Indiana

BRAZIL, IND.—City, F. K. DeArmay clerk, plans construction of an electric light plant to cost about $660,000. Burns & McDonnell, Interstate building, Kansas City, Mo., are engineers.

FORT WAYNE, IND.—American Steel Dredge Co. Inc. has been incorporated with 500 shares no par value to manufacture dredging machinery and equipment, by Walter L. Walf, Phil M. McNagny and Leigh L. Hunt, Fort Wayne.

INDIANAPOLIS—Rost Mfg. Co. has been incorporated with 1000 shares no par value to manufacture sheet metal products, by Kenneth C. Ridge, William L. Drake and J. Weimhardt, Indianapolis.

Illinois

AURORA, ILL.—Lyon Metal Products Inc. has added to its tool equipment at a cost of $8260.

CHICAGO—A. L. Hansen Co., 5037 Ravenswood avenue, manufacturer of machinery, suffered damage of about $25,000 by fire recently.

CHICAGO—Sears Roebuck & Co., Chicago, is having plans made for a boiler plant and engine room addition to its plant, to cost about $250,000.

CHICAGO — Universal Machine

WHERE-TO-BUY

A classified list of advertisers according to products. ¶Index to advertisements gives page number of any advertiser.

ABRASIVES (Polishing)
Carborundum Co., Niagara Falls, N. Y.
Norton Co., Worcester, Mass.

ACCUMULATORS
Logemann Brothers Co., 3126 Burleigh St., Milwaukee.

ACETYLENE
Linde Air Products Co., 30 E. 42nd St., New York City.

ACIDS (Pickling)
American Chemical Paint Co., Ambler, Pa.

AIR COMPRESSORS—See COMPRESSORS (Air)

ALLOYS—See FERROALLOYS

ANGLES, CHANNELS—See STEEL (Structural)

ARBORS
Morse Twist Drill & Machine Co., New Bedford, Mass.

AXLES
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.

BABBITT METAL
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.

BALING PRESSES
Logemann Brothers Co., 3126 Burleigh St., Milwaukee.

BANDS (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Corrigan, McKinney Steel Co. 3100 E. 45th St., Cleveland, O.

BANDS AND HOOPS (Galvanized Strips)
Sharon Steel Hoop Co., Sharon, Pa.

BAR BENDERS
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.

BARGES (Steel)
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
McClintic-Marshall Corp., Bethlehem, Pa.

BARS (Alloy)
Bethlehem Steel Co., Bethlehem, Pa.
Crucible Steel Co. of America, 17 E. 42d St., New York City
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Republic Steel Corp., Youngstown, O.

BARS (Concrete Reinforcing)
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, O.

BARS (Iron)—See IRON (Bar)

BARS (Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Corrigan, McKinney Steel Co. 3100 E. 45th St., Cleveland, O.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

BEAMS, CHANNELS, ANGLES, ETC.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Weirton Steel Co., Weirton, W. Va.

BEARINGS (Ball)
Bantam Ball Bearing Co., The, South Bend, Ind.

BEARINGS (Journal)
Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Roller)
Bantam Ball Bearing Co., The, South Bend, Ind.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Thrust)
Timken Roller Bearing Co., The, Canton, O.

BENDING AND STRAIGHTENING MACHINES
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland, O.
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.
Logemann Bros. Co., 3126 Burleigh St., Milwaukee.
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

BENZOL AND TOLUOL RECOVERY PLANTS
Koppers Construction Co., 1301 Koppers Bldg., Pittsburgh.

BILLETS (Alloy and Carbon Steel)
Alan Wood Steel Co., Conshohocken, Pa.
Republic Steel Corp., Youngstown, O.
Washburn Wire Co., Phillipsdale, R. I.

BILLETS (Forging)
Heppenstall Co., 47th and Hatfield Sts., Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.

BILLETS AND BLOOMS
Alan Wood Steel Co., Conshohocken, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Corrigan, McKinney Steel Co. 3100 E. 45th St., Cleveland, O.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.

BLAST FURNACE SPECIALTIES
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh, Pa.

BLAST FURNACES—See FURNACES (Blast)

BLOWERS
General Electric Co., Schenectady, N. Y.
Coppus Engineering Corp., 359 Park Ave., Worcester, Mass.

BOILER HEADS
Bethlehem Steel Co., Bethlehem, Pa.

BOILER TUBES—See TUBES (Boiler)

BOLTS
Bethlehem Steel Co., Bethlehem, Pa.
Clark Bros. Bolt Co., Ridge Rd., Millidale, Conn.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.

BRAKES (Electric)
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland, O.

BRICK (Fire Clay)
Eureka Fire Brick Works, 1015 House Bldg., Pittsburgh, Pa.

BRICK (Insulating)—See INSULATING BRICK

BRICK (Silicon Carbide)
Carborundum Co., Perth Amboy, N. J.
Norton Co., Worcester, Mass.

BRIDGE CRANES (Ore and Coal Handling)
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

BRIDGES, BUILDINGS, VIADUCTS, STACKS
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
Belmont Iron Works, 22nd & Washington Ave., Philadelphia, Pa.
McClintic-Marshall Corp., Bethlehem, Pa.
Truscon Steel Co., Youngstown, O.

BUCKETS (Clam Shell, Dragline, Grab, Single Line)
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

BUILDINGS (Steel)—See BRIDGES, ETC.

BULLDOZERS
Logemann Bros. Co., 3126 Burleigh St., Milwaukee.

BURNERS (Acetylene)—See TORCHES & BURNERS

BURNERS (Automatic)
American Heat Economy Bureau Inc., Wabash Bldg., Pittsburgh, Pa.
Ohio Valley Clay Co., Steubenville, Ohio.

BURNERS (Fuel, Oil, Gas, Combination)
Ohio Valley Clay Co., Steubenville, Ohio.

BURNERS (Luminous Flame)
Ohio Valley Clay Co., Steubenville, Ohio.

BY-PRODUCT PLANTS
Koppers Construction Co., 1301 Koppers Bldg., Pittsburgh, Pa.

CAP SCREWS—See SCREWS (Cap, Set, Safety)

CARBIDE
Linde Air Products Co., 30 E. 42nd St., New York City

CAR DUMPERS
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

CARS (Industrial and Mining)
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland.
Bethlehem Steel Co., Bethlehem, Pa.

CASTINGS (Acid Resisting)
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
International Nickel Co., 67 Wall St., New York City.

CASTINGS (Alloy Steel)
American Steel Foundries, 410 No. Michigan Ave., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.

CASTINGS (Brass, Bronze, Copper, Aluminum)
Bethlehem Steel Co., Bethlehem, Pa.
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.

CASTINGS (Electric Steel)
Pittsburgh Electric Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
West Steel Casting Co., 805 E. 70th St., Cleveland, O.

CASTINGS (Gray Iron)
Bethlehem Steel Co., Bethlehem, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
National Roll & Foundry Co., The, Avonmore, Pa.

CASTINGS (Heat Resisting)
Driver-Harris Co., Harrison, N. J.

CASTINGS (Malleable)
Peoria Malleable Castings Co., Peoria, Ill.

CASTINGS (Manganese Steel)
Commercial Steel Casting Co., Marion, Ohio.

Products Co., 3242 North California avenue, has been incorporated with 2000 shares no par value to conduct a general machine shop business, by Kelly, Pratt & Zeiss, 1004 Harris Trust building, Chicago.

CHICAGO—North American Brewing Co., 2336 Bosworth street, is having plans made for an addition to its plant, to cost about $100,000, including equipment. Richard Griesser & Son, 64 West Randolph street, Chicago, are architects.

CHICAGO—Wilson & Co., Union Stock Yards, Chicago, will spend about $600,000 in rebuilding and re-equipping a boiler plant and engine room.

Southern States

LAUREL, DEL.—Carefree Heat Inc. has been incorporated with $50,000 capital to manufacture heating devices and equipment, by E. N. Smith and associates.

WASHINGTON—Bureau of supplies and accounts, navy department, will take bids Dec. 20, as follows: Schedule 9212, one motor-driven geared-head gap lathe for Mountain View, Calif.; schedule 9217, motor-driven vertical turret lathe for Philadelphia navy yard; schedule 9218, two motor-driven horizontal boring mills for Puget Sound, Wash.; schedule 9256, one arc welder set and spare parts, for Brooklyn, N. Y., navy yard; schedule 9220, one motor-driven precision-type bench lathe for Brooklyn navy yard; schedule 9225, one motor-driven boring, drilling and milling machine for Philadelphia navy yard; schedule 9236, one motor-driven gear generating machine for Portsmouth, N. H., navy yard.

Texas

FORT WORTH, TEX.—Sinclair Refining Co., headquarters at 45 Nassau street, New York, plans installation of power equipment, air compressors, pumps, tanks and other equipment in its improvement program here, involving about $650,000.

Wisconsin

KENOSHA, WIS.—American Brass Co. has reopened several departments of its plant here to handle a large order for copper tubing from a automobile radiator manufacturer.

MILWAUKEE — National Plating Co., 325 North Eighth street, suffered about $6000 damage by fire recently. Production will be resumed as soon as repairs can be made.

MILWAUKEE—Nordberg Mfg. Co., 3072 South Chase avenue, suffered loss by fire recently to the extent of about $10,000 to stock and pattern storage.

MILWAUKEE — Milwaukee Gas Cock Mfg. Co., 1000 West Bruce street, has leased larger space in the Pabst Corp. industrial unit at 1200 West Pierce street and will occupy it about Jan. 1, when alterations have been completed.

MILWAUKEE—Stanek Cutting Die Co. has been incorporated by Robert A. Ewens, 5906 North Kent street, and H. J. Widmeyer, 1639 North Twelfth street, and is establishing a plant for the manufacture of cutting dies.

RACINE, WIS.—Electric Motor Corp. has been organized by I. H. Dunham and is operating a plant at 401 Lake avenue, specializing in the manufacture of fractional horsepower electric motors.

Colorado

DENVER, COLO.—United States bureau of reclamation will ask bids about March 1 for about 2000 tons of base and inlet castings for intake towers, cast iron and steel, for Boulder Dam.

Montana

GREAT FALLS, MONT.—Lease & Leighland have been awarded a contract by Deer Lodge, Mont., for a complete water system, including wells, centrifugal turbine pumps and reservoir, to cost $137,850.

Arizona

MIAMI, ARIZ.—Texas Co., 929 South Broadway, Los Angeles, plans to rebuild its oil storage plant here, destroyed by fire in September, to cost about $30,000.

PHOENIX, ARIZ.—Verde River Irrigation & Power District, W. H. Bartlett secretary, Security building, is having plans made for four hydroelectric power plants, with substations, transmission lines, electrically operated pumping stations and auxiliaries, involving about $16,000,000.

Pacific Coast

BURBANK, CALIF. — Lockheed Aircraft Corp., Cyril Chappellet, secretary, is perfecting an all-metal, low-wing cantilever monoplane on which production is expected to start this winter.

ESCONDIDO, CALIF.—John H. Chase, special engineer, has been authorized to prepare plans and specifications for a new municipal electric system and power plant.

LOS ANGELES—Consolidated Steel Corp., Slauson and Eastern avenues, has taken a contract for building a pressure distillate stabilizing unit at Wilmington, Calif., for the Union Oil Co. of California, to cost about $170,000.

MARCH FIELD, CALIF.—United States Construction Quartermaster, March Field, is preparing plans for a group of service buildings to cost about $252,000.

SAN DIEGO, CALIF.—Ocean Industries Inc., San Diego, plans rebuilding its cannery at Turtle Bay, Lower Calif., burned recently with loss of $90,000. T. Abe, San Diego, is manager.

SAN BRUNO, CALIF.—American Brake Shoe Co., 74 New Montgomery street, San Francisco, has bought a site on Linden avenue for construction of a plant in 1933, to cost about $50,000. (Noted Oct. 31.)

SAN FRANCISCO—Pacific Gas & Electric Co., 245 Market street, is establishing a fund of $5,000,000 for extensions and improvements to its power plants, including installation of considerable equipment.

SAN FRANCISCO—F. W. Snook Co., 596 Clay street, has been given an order by the United States forest service for a complete water supply system and sanitary sewer system at the Benton field air depot, Alameda, Calif., to cost $10,650.

HILLSBORO, OREG.—City council plans construction of a municipal water system to cost about $300,000. Barr & Cunningham, consulting engineers, Spalding building, Portland, Oreg., have made a preliminary survey.

PORTLAND, OREG.—Public Market Co., C. L. Wilson general manager, plans a 4-story fire-proof market building 140 x 616 feet on Front street, to cost about $1,400,000. Cold storage and dry storage facilities will be included. Lawrence, Holford, Allen & Dean are architects.

CHEWELAH, WASH.—Northwest Magnesite Co., J. C. Hutchinson manager, has increased operations in its mines and plant, adding 150 men, with two kilns in operation.

SEATTLE—Automatic Bridge Gate & Mfg. Co. has been incorporated with $40,000 capital to manufacture valves and allied products, by Arthur Foshay and C. H. McKinney, Seattle.

TACOMA, WASH.—Western Steel Casting Co. has been incorporated with $5000 capital to fabricate steel and iron products, by M. S. Alexander and associates. Henderson, Carnahan & Thompson are attorneys for the company.

Dominion of Canada

EDMONTON, ALTA.—A small oil refinery is announced for early construction here, the first unit to cost $40,000 and further development to follow soon.

VANCOUVER, B. C.—Harbor commissioners have completed arrangements with the federal government for extension of the Lapointe pier and construction of additional trackage facilities at Hastings mill site, about $1,000,000.

WEYBURN, SASK.—Industrial department of the Canadian National railways announces an oil refinery is to be established here with daily capacity of 100 to 150 barrels. J. A. McBride, president Crown Oil Co., is backing the project.

WHERE-TO-BUY

CASTINGS (Steel)
Allegheny Steel Co., Brackenridge, Pa.
American Steel Foundries, 410 No. Michigan Ave., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Mach. Co., Birdsboro, Pa.
Commercial Steel Casting Co., Marion, Ohio.
Mackintosh-Hemphill Co., Penn Ave. at Water St., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
National Roll & Foundry Co., The, Avonmore, Pa.
West Steel Casting Co., 805 E. 70th St., Cleveland.

CASTINGS (Worm & Gear Bronze)
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.

CASTORS (Plate Mills)—See PLATE CASTORS

CEMENT (High Temperature)
Carborundum Co., Perth Amboy, N. J.

CHROME ORE
Samuel Frank, & Co., Inc., Harrison Bldg., Philadelphia.

CHROMIUM METAL
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

CLEANING SPECIALTIES
American Chemical Paint Co., Ambler, Pa.

COAL AND COKE
Alan Wood Steel Co., Conshohocken, Pa.
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, O
Hanna Furnace Corp., The, Buffalo, N. Y.
Interlake Iron Corp., Union Trust Bldg., Cleveland, O.
Oglebay, Norton & Co., Hanna Bldg., Cleveland, O.
Pickands, Mather & Co., Union Trust Bldg., Cleveland, O.
Shenango Furnace Co., Oliver Bldg., Pittsburgh, Pa.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.

COKE—See COAL AND COKE

COKE OVEN MACHINERY
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

COKE OVENS (By-Product)
Koppers Construction Co., 1301 Koppers Bldg., Pittsburgh.

COMPENSATORS (Automatic)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

COMPRESSORS (Air)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Curtis Pneumatic Machinery Co., 1996 Kienlen Ave., St. Louis, Mo.
General Electric Co., Schenectady, N. Y.

CONCRETE REINFORCING BARS—See BARS (Concrete Reinforcing)

CONDENSERS (Surface, Barometric, Multi-Jet)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

CONDUITS (Electric)
Young-stown Sheet & Tube Co., Youngstown, O

CONTRACTORS—See ENGINEERS AND CONTRACTORS

CONTROLLERS (Electric)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

CONVEYOR BELTS (High & Low Temperature)
Wickwire Spencer Steel Co., 41 E. 42nd St., New York City.

COOLING EQUIPMENT
Coppus Engineering Corp., 359 Park Ave., Worcester, Mass

COTTER PINS
Hindley Mfg. Co., Valley Falls, R. I.

COUPLINGS (Flexible)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

CRANES (Charging)
Alliance Machine Co., The, Alliance, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Morgan Engineering Co., Alliance, O.

CRANES (Creeper, Erection)
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.

CRANES (Electric)
Alliance Machine Co., The, Alliance, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Morgan Engineering Co., Alliance, O.

CUTTING AND WELDING—See WELDING

CUTTING OILS
Sun Oil Co., 1608 Walnut St., Philadelphia, Pa.

CYLINDERS (Pressure)
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Scaife, Wm. B., & Sons Co., Oakmont, Pa.

DEOXIDIZERS
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 120 Broadway, New York City.

DIE BLOCKS
Bethlehem Steel Co., Bethlehem, Pa.
Heppenstall Co., 47th and Hatfield Sts., Pittsburgh, Pa.

DOORS AND SHUTTERS (Steel, Fire and Rolling)
Truscon Steel Co., Pressed Steel Div., Youngstown, O.

DRILLING MACHINES (Multiple, Heavy Duty)
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

DRILLING MACHINES (Radial)
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

DRILLS (Twist)—See TWIST DRILLS

DRIVES (Cut Herringbone Gears)
Farrel-Birmingham Co., Inc., 322 Vulcan St., Buffalo, N. Y.
Lewis Foundry & Machine Co., P. O. Box 1591, Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.

DRIVES (Multi V-Belt)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

DUST ARRESTOR EQUIPMENT
American Foundry Equipment Co., Mishawaka, Ind.

ELECTRICAL EQUIPMENT
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.
General Electric Co., Schenectady, N. Y.

ELECTRIC HEATING ELEMENTS
Globar Corp., Niagara Falls, N. Y.

ELECTRIC WELDING (See Welding)

ENGINEERS AND CONTRACTORS
Laughlin, Alex, & Co., First National Bk. Bldg., Pittsburgh, Pa.
Wean Engineering Co., Warren, Ohio.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

ENGINEERS (Consulting)
Freyn Engineering Co., 310 S. Michigan Ave., Chicago, Ill.
Perin Engineering Co., Inc., 11 West 42nd St., New York City.

ENGINEERS, CONSULTING (By-Product Coke Oven & Gas Plants)
Koppers Construction Co., 1301 Koppers Bldg., Pittsburgh.

FACING MACHINES (Structural)
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

FANS (Portable)
Coppus Engineering Corp., 359 Park Ave., Worcester, Mass.
Perkins, B. F., & Son, Inc. Holyoke, Mass.

FERROALLOYS
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, O.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
International Nickel Co., 67 Wall St., New York City.
Oglebay, Norton & Co., Hanna Bldg., Cleveland, O.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 120 Broadway, New York City.

FERROCARBON (Titanium)
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

FERROCHROME
Oglebay, Norton & Co., Hanna Bldg., Cleveland, O.
Vanadium Corp. of America, 120 Broadway, New York City

FERROMANGANESE
Oglebay, Norton & Co., Hanna Bldg., Cleveland, O.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia, Pa

FERROPHOSPHORUS
Oglebay, Norton & Co., Hanna Bldg., Cleveland, O.

FERROSILICON
Oglebay, Norton & Co., Hanna Bldg., Cleveland, O.
Vanadium Corp. of America, 120 Broadway, New York City.

FERROSILICON (Aluminum)
Vanadium Corp. of America, 120 Broadway, New York City.

FERROTUNGSTEN
Electro Metallurgical Sales Corp., 30 East 42nd St., New York City.
Vanadium Corp. of America, 120 Broadway, New York City.

FERROVANADIUM
Vanadium Corp. of America, 120 Broadway, New York City

FLASKS (Foundry)
Truscon Steel Co., Youngstown, O.

FLOORING (Steel)
Alan Wood Steel Co., Conshohocken, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.

FLOORS
Union Products Co., 1252 W. 70th St., Cleveland, O

FLUORSPAR
Oglebay, Norton & Co., Hanna Bldg., Cleveland, O.

FORGING BILLETS—See BILLETS (Forging)

FORGING MACHINERY
Cleveland Punch & Shear Wks. Co., 3917 St. Clair Ave., Cleveland, O.

FORGING (Brass, Bronze, Copper)
Revere Copper & Brass, Inc., 230 Park Ave., New York City.

FORGINGS (Drop)
Bethlehem Steel Co., Bethlehem, Pa.
Fruin Drop Forge Co., 341-355 W. Root St., Chicago.

FORGINGS (Iron and Steel)
Heppenstall Co., 47th and Hatfield Sts., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.

FORGINGS (Upset)
Bethlehem Steel Co., Bethlehem, Pa.

FROGS AND SWITCHES
Bethlehem Steel Co., Bethlehem, Pa.

FURNACE CONTROLS (Open Hearth)
Morgan Construction Co., Worcester, Mass.

FURNACE INSULATION—See INSULATION

FURNACES (Blast)
Freyn Engineering Co., 310 S. Michigan Ave., Chicago, Ill.
McClintic-Marshall Corp., Bethlehem, Pa.

FURNACES (Electric Heating)
Electric Furnace Co., The, Wilson St., Salem, O.
General Electric Co., Schenectady, N. Y.
Holcroft & Co., 6545 Epworth Blvd., Detroit, Mich.
Strong, Carlisle & Hammond Co., 1392 W. 3rd St., Cleveland, O.

FURNACES (Electric Melting)
Ajax Electrothermic Corp., Trenton, N. J.
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
General Electric Co., Schenectady, N. Y.
Pittsburgh Electric Furnace Corp., P. O. Box 1125, Pittsburgh, Pa

FURNACES (Forging)
Holcroft & Co., 6545 Epworth Blvd., Detroit, Mich.

FURNACES (Open-Hearth)
Criswell, James, Co., Keenan Bldg., Pittsburgh.
Laughlin, Alex, & Co., First National Bk. Bldg., Pittsburgh, Pa.

FURNACES (Recuperative)
Electric Furnace Co., The, Wilson St., Salem, O.

FURNACES (Sheet and Tin Mill)
Wean Engineering Co., Warren, Ohio.

FURNACES (Steel Mill)
Electric Furnace Co., The, Wilson St., Salem, O.
General Electric Co., Schenectady, N. Y.
Holcroft & Co., 6545 Epworth Blvd., Detroit, Mich.
Morgan Construction Co., Worcester, Mass.

FURNACES (Steel Treating, Annealing & Case Hardening)
Carborundum Co., Perth Amboy, N. J.
Electric Furnace Co., The, Wilson St., Salem, O.
General Electric Co., Schenectady, N. Y.
Holcroft & Co., 6545 Epworth Blvd., Detroit, Mich.
Strong, Carlisle & Hammond Co., 1392 W. 3rd St., Cleveland, O.

GALVANIZING PLANTS FOR SHEETS
Wean Engineering Co., Warren, Ohio.

WHERE-TO-BUY